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Observations on the Herpetofauna of the Asbury Woods Greenway in Pennsylvania	Brian S. Gray	21
A Method for Rearing and Keeping the Eastern Tiger Salamander, <i>Ambystoma tigrinum tigrinum</i>	Joshua M. Kapfer and Shane N. Jones	25
Year 2000 Data on Distribution and Variation of Some Lizards of the <i>Sceloporus undulatus</i> Complex in Chihuahua, Mexico	Julio A. Lemos-Espinal, David L. Auth, David Chiszar and Hobart M. Smith	29
An Incident of Envenomation from <i>Heterodon nasicus</i>	Harlan D. Walley	31
Book Review: <i>Life, Love, and Reptiles: An Autobiography of Sherman A. Minton, Jr., M.D.</i>	Raymond Novotny	32
HerPET-POURRI	Ellin Beltz	33
Unofficial Minutes of the CHS Board Meeting, January 18, 2002		35
Herpetology 2002		37
The Tympanum	Ellin Beltz	41
Advertisements		42
News and Announcements		44

Cover: Tiger salamander, *Ambystoma tigrinum*, larva from Kane County, Illinois. Photograph by Michael Redmer.

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Observations on the Herpetofauna of the Asbury Woods Greenway in Pennsylvania

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Study area

The Asbury Woods Greenway is located about one mile south of U.S. Route 20, off Asbury Road in Millcreek Township, Erie County, Pennsylvania (Figure 1). The Greenway property lies within the gently rolling landscape of the Central Lowland Province. This physiographic province is characterized by low ridges of sand and gravel that represent old beaches formed by Lake Erie at the end of the Pleistocene glaciation (Barnes and Sevon, 1996). The site contains over 200 acres of diverse habitat, including numerous wetlands, forest, fields, and a medium sized stream (Walnut Creek). In addition, the calcareous seep and mesic forest communities occurring in the Walnut Creek Zone are of great significance, due to their imperiled status in Pennsylvania (SCPS, 1999). The Greenway is open to the public year-round, and various recreational opportunities exist, such as hiking, skiing, fishing, etc. Ownership and management of the site is shared, via a partnership between Millcreek Township, Mercyhurst College, and the Millcreek Township School District.

Previous work

Prior to the present study, the James Wildlife Preserve portion of the Greenway had been surveyed by students and faculty of Mercyhurst College. Twenty-two species of amphibians and reptiles were documented over a five-year period (Zimmerman, 1998).

Methods

I conducted a herpetological survey of the Asbury Woods Greenway from 1998 to 2001. The following zones were surveyed: Nature Center, Community Park, Nature Preserve, Walnut Creek, and Browns Farm. The Walnut Creek Middle School and Athletic Fields Zone was not surveyed due to lack of sufficient habitat. Field work was conducted on twenty-one days: twelve days in the autumn of 1998; four days during the spring of 1999; and five days during the spring of 2001. Four

days during the summer of 2000 were spent sampling amphibian larvae. Approximately 72 hours were spent actively searching for amphibians and reptiles in the field (excludes trapping and dipnetting). Most individuals were observed by turning logs, rocks and other cover. Binoculars were used to identify basking turtles, as well as some frogs. Occasionally frogs were identified by their calls prior to being observed. Dipnetting and collapsible funnel traps were used to sample for adult and larval amphibians during the 2000 field season (see below).

Goals

The goals of the survey were to provide information on species richness, relative abundance, and distribution of amphibian and reptile species within the Asbury Greenway. This would provide baseline data that would be helpful to workers planning future research at the site. In addition, such data are also valuable in monitoring population changes.

Sampling amphibian larvae

During the 2000 field season, collapsible funnel traps (manufactured by Ranger Products, Inc., Detroit, MI) were utilized during three days of trapping amphibian larvae at two wetlands. Traps were placed so that the top of the trap protruded approximately 1 cm above the water, thus providing an air space for individuals requiring aerial respiration.

The first site sampled was a vernal pool (25.3 m × 21.0 m, max. depth 0.6 m) off the Chestnut Grove Loop Trail. Traps were employed as follows: on 19 June 2000, four traps were set for 5.25 hours; capturing 43 larvae, of which 41 (95%) were wood frog (*Rana sylvatica*) tadpoles. There was no mortality for day-one captures. All day-one larvae were marked by clipping a small notch in the dorsal tail fin, midway between the base of the tail and the tail tip. Notches did not enter the tail musculature. On 22 June 2000, six traps were set for a period of 23.5 hours, capturing 164 larvae; again the majority (97%) were *R. sylvatica* larvae. Mortality in traps on day two was 17% (n = 27), all of which were *R. sylvatica*. Some tadpoles were approximately 50% consumed. Due to the lack of potential invertebrate predators within the traps, and the sufficient "air space" that was provided, mortality was possibly due to conspecific predation. It has been demonstrated that wood frog tadpoles are capable of macrophagous predation. In the laboratory, Petranks and Kennedy (1999) observed *R. sylvatica* tadpoles attacking, killing and consuming invertebrates. Some oligochaetes used in their experiments were more than five times the length of the tadpoles. Confinement in traps decreases the possibility for prey (tadpoles) to escape. In addition, a higher density of tadpoles within traps would increase the likelihood of a predation event. Further studies are needed to validate intraspecific predation among free swimming *R. sylvatica* tadpoles.

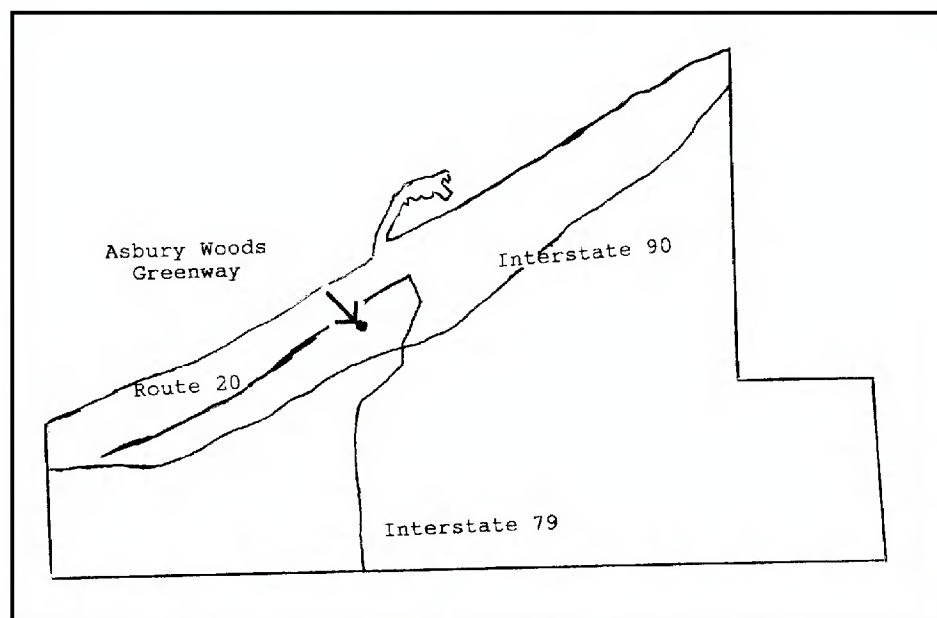


Figure 1. Map of Erie County, Pennsylvania, showing the approximate locality of the Asbury Woods Greenway.

Additional amphibian larvae captured within the vernal pool included four *Ambystoma maculatum*, two *Pseudacris crucifer*, and a single *R. clamitans melanota*. Due to the green frog's extended larval period—tadpoles usually overwinter and metamorphose the following spring—it is not surprising to find so few *R. c. melanota* in this temporary pool. Only two larvae, both *R. sylvatica*, were recaptured during the second day of sampling. Using Bailey's modification of the Petersen index (Donnelly and Guyer, 1994) it was estimated that the number of wood frog tadpoles in this pool was 2186 individuals (SE 1083). Biomass and density were also estimated for wood frog larvae; biomass being ≈ 2.9 kg, with a density of 4.1 *R. sylvatica* larvae per m². Insufficient captures prevented calculating larval population size, biomass, and density for the other species.

A second, more permanent pond (121.9 m $\times$ 30.5 m, max. depth = 1 m) about 46 m to the north of the vernal pool was briefly sampled with four traps in late August 2000. Traps were placed in the water at 14:06 on 21 August 2000, and checked 18.92 hours later on 22 August. Fifteen *R. c. melanota* were captured during this sampling period.

Twelve *Hyla versicolor*, 1 *R. palustris*, and 1 *P. c. crucifer* larvae were captured in the north pond by dipnetting a few days prior to trapping. Time spent dipnetting did not exceed one hour.

Species Accounts

The following list provides information on the twenty-seven species of amphibians and reptiles reported to occur within the Asbury Woods Greenway. Common and scientific names follow those listed in Crother (2000). Information given includes the number of specimens observed (n), excluding larvae. The number of larvae were excluded from these totals because the number of larvae observed were not always counted. In addition, the survivorship of most larvae is rather low (Duellman and Trueb, 1986). Letters following numbers represent relative abundance: A = abundant, 16 or more individuals observed; C = common, 6–15 individuals observed; R = rare, five or fewer individuals observed; and X = not observed during the this survey. Evidence of successful reproduction (fertilized eggs, larvae, or recent metamorphs) is also given.



Figure 2. A male erythristic eastern red-backed salamander (*Plethodon cinereus*) observed in the Oxbow Territory of the Asbury Woods Greenway.

Amphibia

Caudata – Salamanders

Ambystoma jeffersonianum - Jefferson Salamander (6) C - The Jefferson salamander appears to be restricted to the Oxbow Territory (Walnut Creek Zone). Eggs, larvae, and recent metamorphs were also observed.

Ambystoma maculatum - Spotted Salamander (35) A - This salamander is found throughout the Asbury Woods Greenway area. Eggs, larvae, and recent metamorphs were observed.

Desmognathus fuscus fuscus - Northern Dusky Salamander (17) A - Most individuals of this species were observed beneath flat rocks or logs in the Oxbow Territory, but were also seen in the James Wildlife Preserve. A larva was observed in an intermittent stream in the Oxbow Territory.

Desmognathus ochrophaeus - Allegheny Mountain Dusky Salamander (42) A - *Desmognathus ochrophaeus* is found in all zones west of Asbury Road and north of Walnut Creek. A female was observed brooding eggs beneath a log alongside a woodland spring in the Oxbow Territory.

Eurycea bislineata - Northern Two-lined Salamander (1) R - An adult and one larva observed in a intermittent stream in the Oxbow Territory.

Hemidactylium scutatum - Four-toed Salamander (8) C Individuals of this species were observed in the James Wildlife Preserve and the Oxbow Territory. A recent metamorph was observed in the James Preserve beneath a log.

Notophthalmus viridescens viridescens - Red-spotted Newt (17) A - Newts were observed in all zones surveyed. A recent metamorph was observed off the Chestnut Grove Loop Trail.

Plethodon cinereus - Eastern Red-backed Salamander (25) A - Red-backed salamanders were observed throughout the surveyed area. On 12 April 1999, an erythristic individual (Figure 2) was found beneath a flat rock in the Oxbow Territory. Prior to this report, erythristic *P. cinereus* in Pennsylvania were only reported from Potter County (Hulse et al., 2001). Two recently hatched, normally pigmented individuals were observed in the James Wildlife Preserve.

Plethodon glutinosus - Northern Slimy Salamander (2) R - This species was only observed in the Oxbow Territory.

Pseudotriton ruber ruber - Northern Red Salamander (1) R - An adult and an old larva were observed in a woodland spring within the Oxbow Territory.

Anura - Frogs

Bufo americanus americanus - Eastern American Toad (9) C - This species was observed in the James Wildlife Preserve and in the Oxbow Territory. *Bufo a. americanus* tadpoles were observed in puddles at the power lines in the Oxbow Territory.

Hyla versicolor - Gray Treefrog (4) R - A single adult was observed on leaf litter in the Oxbow territory, and three juveniles were seen in the Nature Center Zone. This species may be more common than this report suggests, as numerous indi-



Figure 3. The northern leopard frog (*Rana pipiens*), is a species for which further study is needed to determine its status within the Asbury Woods Greenway.

viduals have been heard calling throughout the Greenway, especially in the area of the Chestnut Grove Loop Trail. *Hyla versicolor* tadpoles have been observed in the pond north of the Chestnut Grove loop trail, and in puddles at the power lines in the Oxbow Territory.

Pseudacris crucifer crucifer - Northern Spring Peeper (12) C - This diminutive frog was seen and/or heard calling from all surveyed zones. Larvae and recent metamorphs were observed in pools of the Nature Center Zone.

Rana catesbeiana - American Bullfrog (2) R - Only two individuals of this species were observed; an adult and a juvenile. Both were observed in the Bog-iron Pond in the Asbury Community Park Zone.

Rana clamitans melanota - Northern Green Frog (35) A - This species was observed throughout the Asbury Woods Greenway. Larvae and recent metamorphs were observed in the Nature Center Zone.

Rana palustris - Pickerel Frog (3) R - The pickerel frog was observed within the Nature Center Zone, along the Chestnut Grove Loop trail, and within the Oxbow Territory. A single larva was observed in the pond north of the Chestnut Grove Loop Trail. Recent metamorphs were also observed in the Nature Center Zone.

Rana pipiens - Northern Leopard Frog (Figure 3) (0) X - No specimens of leopard frog were seen during the present study. Ostrander (2000) lists this species as being present at Asbury Woods. There is definitely suitable habitat for this species, especially in the James Wildlife Preserve. Further study is needed to determine the status of this species within the Asbury Greenway.

Rana sylvatica - Wood Frog (5) R - The wood frog has been observed in the Nature Center Zone. A single individual was seen in the Oxbow Territory. Most likely, this species is more common than appears. Further surveys during late winter and early spring may validate this. The wood frog has a very brief breeding season, generally less than 7 days. During this period, aggregations of males can be heard calling for some distance, thus making this the best time to look for this species.

Eggs, larvae, and recent metamorphs were observed in the Nature Center Zone. Eggs and larvae were also observed in the Oxbow Territory. See above for a discussion on the sampling of amphibian larvae in the Nature Center Zone.

Reptilia

Testudines – Turtles

Chelydra serpentina serpentina - Eastern Snapping Turtle (3) R - Three adult individuals of this species were observed. The first was observed in a small stream in the James Wildlife Preserve, the second specimen was seen in the pond north of the Chestnut Grove Loop Trail, and the third was in the “swamp” in the Nature Center Zone. This species may be more common than observed.

Chrysemys picta marginata - Midland Painted Turtle (22) A - Painted turtles were observed in ponds and pools within the Nature Center Zone, and the James Wildlife Preserve. The abundance of this species may be overestimated, as some individuals may have been counted more than once on separate days of surveying.

Serpentes – Snakes

Diadophis punctatus edwardsii - Northern Ring-necked Snake (2) R - Two adults were found beneath separate flat rocks, along a wooded area of Walnut Creek in the Oxbow Territory.

Elaphe obsoleta obsoleta - Black Ratsnake (1) R - A single specimen was observed in the James Wildlife Preserve. This snake may be more common than the present report suggests. Staff at the nature center reported to have seen black ratsnakes in areas of the Asbury Woods Nature Center and Browns Farm.

Lampropeltis triangulum triangulum - Eastern Milksnake (0) X - No specimens of this snake were observed during this study. Staff at the nature center state that they have seen this species on the Browns Farm section of the Greenway. Ostrander (2000) reports that this species occurs at Asbury Woods.

Nerodia sipedon sipedon - Northern Watersnake (8) C - The northern watersnake is most common along Walnut Creek in the Oxbow Territory, but also was observed at the Bog-iron Pond in the Community Park Zone.

Storeria dekayi dekayi - Northern Brownsnake (0) X - No individuals of *S. d. dekayi* were observed during this survey. It has been reported from the James Wildlife Preserve by Michael Campbell (pers. com.).

Thamnophis sauritus septentrionalis - Northern Ribbonsnake (1) R - A single male specimen was observed 11 August 1998, while consuming a juvenile green frog. The observation occurred in the Asbury Community Park Zone, near the Bog Iron Pond. Future work is necessary to determine the status of this species.

Thamnophis sirtalis sirtalis - Eastern Gartersnake (4) R - This species was observed in Asbury Community Park, the James Wildlife Preserve, and the Oxbow Territory. Probably more common than the current data suggest.

Summary

During the Asbury Woods Greenway survey, 265 individuals (excluding amphibian larvae) of twenty-four species (17 amphibian and 7 reptile) were observed, including five species that were not previously reported. Three species known to occur at the site, the Northern Leopard Frog (*Rana pipiens*), the Northern Brownsnake (*Storeria d. dekayi*), and the Eastern Milksnake (*Lampropeltis t. triangulum*) were not observed. This may be due in part to the short duration and sporadic nature of the present survey. Further study is needed to determine the status of these three species. In the case of the two species of snakes that weren't encountered, it should be noted that more effort was focused on surveying amphibians than reptiles.

Evidence of successful reproduction was observed for 15 of the 17 species of amphibians observed within the Greenway (see individual species accounts).

In the future, in addition to a visual encounter survey approach, I would recommend researchers use drift fences with pitfall and funnel traps to better sample the herpetofauna (snakes in particular) of this site. This technique provides 24-hour sampling and avoids the sampling biases introduced by the quality of the collector and timing of the search that are unavoidable with search-and-seize methods (Karns, 1986). Drift

fences and pitfall traps may be circumvented by some individuals, such as large snakes, large turtles, and treefrogs (Dodd, 1991; Karns, 1986). It should also be noted that setting up and maintaining drift fences with traps is labor intensive, costly, and requires more personnel (4–6 people) than a visual encounter survey alone (Heyer et al., 1994). With rapid residential development occurring adjacent to the Greenway—south of the Nature Preserve and Asbury Community Park zones and east of the Walnut Creek Zone—it is recommended that amphibians and reptiles in these areas in particular, be monitored for possible population and/ or distribution changes. In addition, certain characteristics of their habitats, such as water and soil pH, canopy coverage, and presence of contaminants, etc., should also be monitored as potential contributing factors of such changes.

Acknowledgments

I wish to thank Brian Winslow (Director of Asbury Woods Nature Center) for permission to conduct a herpetological survey along the Greenway; Dr. Michael Campbell (Professor of Biology, Mercyhurst College) for sharing his knowledge of amphibians and reptiles within the James Wildlife Preserve; and Mark Lethaby for reviewing an earlier version of the manuscript, and providing helpful comments and suggestions.

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A Method for Rearing and Keeping the Eastern Tiger Salamander, *Ambystoma tigrinum tigrinum*

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Abstract

Worldwide declines in amphibian populations have spurred much laboratory research involving amphibians as test subjects. Unfortunately, detailed methods for the proper care of these animals under laboratory conditions are difficult to acquire. Most descriptions of husbandry methods are brief and associated with studies not specifically focused on the captive care of the species involved. The eastern tiger salamander (*Ambystoma tigrinum tigrinum*) is a large pond-breeding ambystomatid that is frequently encountered in the Upper Midwest. Therefore, its relevance as a test species when studying caudates in the northern portion of the United States is high. Here, we outline, in detail, an inexpensive and easily replicable method for rearing larval and adult *A. t. tigrinum* in the laboratory.

Amphibians have become the focus of much research in recent years. Global declines in amphibian populations have prompted many studies focusing on how amphibians are affected by several factors, including anthropogenic toxicants, habitat loss, parasitic infections, and ultraviolet radiation (Souder, 2000). While a substantial amount of research has been conducted in these areas (e.g., Ankley et al., 1998; Bishop et al., 1997; Bishop et al., 2000; Blaustein et al., 1995; Burkhardt et al., 1998; Carey and Bryant, 1995; Daszak et al., 1999; Johnson et al., 1999; Knutson et al., 1999) there is still much that is unknown about how these variables affect amphibians. Due to the increased need for research on amphibians (Beebee, 1996; Blaustein, 1994; Pechman et al., 1991; Souder, 2000), the requirement for knowledge about their rearing in captivity has likewise become more important.

While some pertinent information is available on the culturing of the embryos of salamanders belonging to the families Ambystomatidae and Plethodontidae (e.g., Bernardo and Arnold, 1999; Smyers and Rubbo, 2001; Vess and Harris, 1997), very little is available that solely focuses on the captive rearing of later-stage larvae or adults. In addition, methods for the captive care of many salamander species are: 1) brief, 2) generally sporadic in the literature, and 3) often found within methods sections for studies that did not focus on the captive rearing of the species involved (e.g., Placyk and Graves, 2001; Rundio and Olson, 2001; Wells and Harris, 2001). Therefore, finding detailed methods for the proper care of these individuals within the literature can be difficult if one does not know exactly where to look.

Proper care of these amphibians is essential if they are to be reliable experimental subjects. Therefore, it is important that captive care methods for a given species be easily found and readily available as their own entity (and not associated with another study) within the herpetological literature.

The eastern tiger salamander (*Ambystoma tigrinum tigrinum*) is a large (18 to 33 cm total length), pond-breeding ambystomatid frequently found in ephemeral wetlands throughout the upper Midwest (Casper, 1996; Harding, 1997; Oldfield and Moriarty, 1994). In fishless ponds, *A. t. tigrinum* larvae

can be considered keystone predators and are therefore important for wetland ecosystems (Lannoo, 1996). Because of its large size, relatively high local abundance, and ease of culturing, *A. t. tigrinum* can be a model organism for several types of laboratory experiments, including toxicological assays, predator-prey interaction experiments, and developmental research.

We have cultured individuals of *Ambystoma tigrinum tigrinum* at various stages of development, over two consecutive years. Our rearing techniques were designed to minimize the amount of stress to the salamanders, yet maintain simplicity.

Methods

Larval Husbandry

Salamander larvae were housed in glass aquaria that were filled with well water (Table 1). Well water was always warmed to 22 to 25°C prior to use. If well water is unavailable, amphibians can successfully be reared in aged tap water (pers. obs.). However, this can be arduous if many tanks are employed. It is inadvisable to house individuals in field-collected water for prolonged periods unless frequent water changes are made. Pond water can harbor opportunistic bacteria (e.g., *Aeromonas hydrophila*) that may become pathogenic if allowed to accumulate and gain access to stressed individuals.

Water changes were made approximately every 2 to 3 d, with roughly 85% of the old water being removed via siphon and replaced with fresh water. On occasion, water changes were made only once during a 5-d period with no observed negative effects. Water was gently aerated; however, this may not be necessary due to the ability of *Ambystoma tigrinum tigrinum* larvae to inhabit water bodies that may go anoxic. All tanks were supplied with submergent vegetation (*Ceratophyllum* sp.) acquired from a biological supply company. This provided developing larvae with a substrate for concealment that presumably helped reduce stress. A photoperiod of approximately 14 h light and 10 h dark was established using fluorescent aquarium lights connected to a timer.

In nature, *Ambystoma tigrinum tigrinum* larvae at several

stages of development may feed heavily upon small invertebrates (pers. obs., Kapfer; Lannoo and Bachmann, 1984), therefore it is advisable to have cultures of aquatic invertebrates such as *Daphnia* sp. available. *Daphnia* sp. are easily cultured and sold by most biological supply companies at a minimal cost. *Ambystoma t. tigrinum* larvae appear to be opportunistic feeders, so care should be taken not to allow individuals to overfeed. Generally, individuals were not fed over weekends, with no observed effect. Feeding regimens were dependant upon larval size (Table 1).

Although never reared in our laboratory, we assume that newly hatched individuals [0.8 to 2.0 cm snout–vent length (SVL)] could be cultured in a similar fashion to that of 2.0 to 2.7 cm individuals (see below). When exchanging water, care must be taken not to accidentally siphon up small larvae as this will cause unneeded stress. At this size, *Ambystoma tigrinum tigrinum* larvae can be offered *Daphnia* of varying sizes (Table 1), which presents individuals with a range from which to choose.

The smallest individuals cultured in our laboratory had an approximate SVL of 2.0 to 2.7 cm. At this stage in development, forelimbs had not yet emerged (or had scarcely begun). Larvae of this size were exclusively fed *Daphnia* several times during an 8-h period (depending on how fast larvae consumed prey) (Table 1). Exact numbers of *Daphnia* fed to each salamander were not recorded, but all individuals were observed to ensure that each was feeding.

While *Daphnia* was the main food source offered to early-stage larvae, older individuals were also fed larger invertebrates (i.e., nightcrawlers, dragonfly nymphs) and small vertebrates (i.e., tadpoles, fathead minnows) (Table 1). Earthworms and fathead minnows (*Pimephales promelas*) can be acquired from local bait stores. Because fathead minnows were usually too quick for salamander larvae, they were held

with a forceps in front of each larva to allow greater ease of feeding. Tadpoles and dragonfly nymphs were field collected and used less frequently than earthworms or fathead minnows. It should be noted that Lannoo and Bachmann (1984) found even large *Ambystoma tigrinum tigrinum* larvae (up to 7.3 cm) to have mostly *Daphnia* sp. in their stomachs. However, in a laboratory setting it seems easier to offer larger larvae bigger prey to be sure of the exact amount consumed by each individual.

When a SVL of approximately 5.0 cm was attained, aquaria densities were lowered and larval diets switched to include larger prey (Table 1). The amount of food offered per sitting depended on the voraciousness of larvae (Table 1).

Upon reaching a SVL of approximately 7.5 cm, larval diets were again altered to include nightcrawlers, larger fathead minnows, tadpoles (*Hyla versicolor*, *Bufo americanus*), and dragonfly nymphs (*Anax* sp.) (Table 1). Larvae were fed daily, whereas the eagerness of larvae to feed determined the amount of food offered. Individuals were fed half of one nightcrawler in the morning and again at the end of an 8 h period. If other prey items were offered (such as tadpoles, minnows, or dragonfly nymphs), two of these were usually offered twice daily (two in the morning and two again in 8 h). Any uneaten prey remaining from previous feeding periods were removed. It may be useful to place individual larvae of this size in 10-gal aquaria if currently housed in smaller enclosures (although we continued to hold our individuals in 2.5-gal aquaria with no observed negative effects).

Adult Husbandry

Metamorphosis occurred in approximately 1.5 months. At the onset of metamorphosis, individuals began to darken in pigmentation, resorb their gills, and their eyes began to protrude from their sockets (pers. obs.). When this was observed, larvae were transferred to 10-gal aquaria that were set at an angle and filled with approximately 5 l of well water. The

Table 1. *Ambystoma tigrinum tigrinum* husbandry regimen with respect to snout–vent length (SVL).

	SVL (cm)	Prey offered	Prey size (cm)	Frequency	Individuals / aquarium size
Larvae	0.8 – 2.0	<i>Daphnia</i> sp.	Various	Daily (ad libitum)	5 / 2.5-gal; 10 / 10-gal
	2.1 – 4.9	<i>Daphnia</i> sp.	Various	Daily (ad libitum)	2 / 2.5-gal; 5 / 10-gal
	5.0 – 7.4	<i>Daphnia</i> sp.	Various	3 times / week	1 / 2.5-gal; 2 / 10-gal
	7.5 – metamorphosis	Leafworms*	4.0 – 6.0	two offered 2 times / week	1 / 2.5-gal; 1 / 10-gal
		Fathead minnows*	3.0	two offered 2 times / week	
		Fathead minnows*	6.0	two offered 2 times / day	
		Nightcrawlers (halved)*	8.0	2 times / day	
		Tadpoles*	Various	two offered 2 times / day	
		Dragonfly nymphs*	Various	two offered 2 times / day	
Adults	5.0 – 8.4	Fathead minnows*	6.0	two offered every 1–2 days	2 / 10-gal
		Nightcrawlers*	8.0	two offered every 1–2 days	
		Crickets*	Various	three offered every 1–2 days	
	8.5 – ≥12.5	Fathead minnows*	6.0	three offered every 2–3 days	1 / 10-gal
		Nightcrawlers*	12.0	one offered every 2–3 days	
		Crickets*	Various	5 offered every 2–3 days	

* indicates prey items that were rotated to provide a varied diet.

purpose of slanting aquaria was to insure that one side of the aquarium remained dry for metamorphosing individuals to leave the water. Small rocks were also placed on the dry edge of the aquaria as a substrate to assist newly metamorphosing individuals in leaving the water.

When gills were completely resorbed and larvae began spending the majority of their time on the dry side of the aquarium, they were transferred to a terrestrial enclosure. Metamorphosed individuals were initially housed in densities of two per 10-gal tank (Table 1); however, they grow fast and should probably be separated or put into larger aquaria within one to four weeks (depending on the size of each individual).

Terrestrial enclosures consisted of 10-gal aquaria with screen tops. Because adult *Ambystoma tigrinum tigrinum* are fossorial, a thick substrate of soil is necessary. Therefore, enclosures were lined with approximately 2.0 cm of aquarium gravel upon which 7.0 cm of sterile potting soil was placed (keep in mind that some retailers sell potting soil that may contain fertilizers and care should be taken to avoid these). We also placed a 1.0 cm layer of shredded “herptile” bark (such as Repti-bark®) on top of the potting soil, though this is not required. Also, flat pieces of cork bark, driftwood, or rocks should be added to provide adults with debris to conceal themselves.

Growing small plants in the terrestrial enclosures seemed to be beneficial to the animals. Watering live plants helps to keep soil moist. Likewise, live plants aid in creating a more naturalistic habitat, which may reduce stress in adult salamanders. If live plants are incorporated, it is advisable to use plant species such as ivy that grow “outward” instead of “upward.” This provides more ground cover for adult salamanders.

Because most salamanders require a significant amount of moisture to survive, soil should always be moist. For salamanders kept in 10-gal aquaria, approximately 0.5–1.0 l of well water or aged tap water was added every two to three days with care taken to avoid allowing soil to become overly moist or soupy. Approximately 75% of the soil was replaced every three to five months.

Whether live plants are implemented or not, fluorescent lighting should be provided (similar to that of an aquarium

strip-light) at a photoperiod of approximately 14 h light : 10 h dark. Adult salamanders can be kept at room temperature as long as it stays between approximately 18 and 30°C. If the temperature drops below 18°C it is generally not a direct threat to adult salamander health; however, they may not feed if chilled. Because salamanders are poikilothermic, temperatures exceeding 30°C can be lethal.

It should be noted that these temperature and lighting regimens are appropriate when rearing adult *Ambystoma tigrinum tigrinum* that are not being cultured for captive breeding. To breed salamanders in captivity, temperature and lighting durations should be cyclic to mimic that of the natural environment. We did not attempt captive breeding of *A. t. tigrinum*.

Adult *Ambystoma tigrinum tigrinum* can be fed a variety of food items. These include domestic crickets, nightcrawlers, fathead minnows, and even immature (or “pinky”) mice. We have had success feeding our adult salamanders all of the above food items. Feeding schedules and the amount of food offered was dependent on salamander size (Table 1).

Conclusion

We believe that these are simple (yet detailed) and easily replicable methods for rearing *Ambystoma tigrinum tigrinum* in captivity that require a small amount of time and resources. We also feel that this manuscript includes methods to care for *A. t. tigrinum* at all stages of development and is a valuable resource. The significance of studying amphibians has become apparent due to the lack of information available on aspects of their life history strategies. Due to an increase in laboratory studies that use amphibians as a model organism (e.g., Frog Embryo Teratogenesis Assay—*Xenopus* (FETAX); ASTM, 1998), the importance of detailed and readily available methods for their proper care in captivity is a necessity.

Acknowledgments

We thank Dr. Erik Wild at the University of Wisconsin–Stevens Point and Dr. Jasmine Saros at the University of Wisconsin–LaCrosse, whose suggestions greatly improved the quality of this manuscript. We also thank Paul Drevnick, whose thesis research supplied us with fathead minnows to feed our growing salamanders.

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Year 2000 Data on Distribution and Variation of Some Lizards of the *Sceloporus undulatus* Complex in Chihuahua, Mexico

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Abstract

Variational data on 98 specimens of *Sceloporus belli* from areas of Chihuahua not previously sampled confirms that *S. belli* occurs throughout the state east of the western mountains, except in the north where the diminutive, boldly striped *S. u. speari* occurs. We conclude that *S. u. consobrinus* is unknown and probably does not occur in the state, although the northwestern corner is not as yet adequately sampled.

Efforts to explore on phenotypic grounds the relationships of *Sceloporus belli* and other taxa of the *S. undulatus* complex continued in the summer of 2000, with samples totaling 98 specimens collected by JLE in scattered areas of eastern Chihuahua and western Coahuila. We here review those samples and a large sample of *S. virgatus* from western Chihuahua. All material bears catalog numbers in the collections of Unidad Biotecnología y Prototipos (UBIPRO) and is from Chihuahua unless otherwise specified.

Sceloporus belli Smith, Chiszar and Lemos-Espinal

All specimens were taken in 5 widely separated plains and foothills enclaves, I–V, as shown on the accompanying map. We here review the significant differential character-states in those areas that may throw light on the relationship of *S. belli* and *S. undulatus consobrinus*.

It is already well known that *S. belli* and *S. u. speari* have overlapping ranges where different environments interdigitate (Lemos-Espinal et al., 1998). Hence these taxa appear to belong to different species, with no evidence of intergradation.

However, sympatry of *S. belli* and *S. u. consobrinus* is not known despite the proximity of their ranges over wide areas of Coahuila, and smaller areas of Nuevo León and possibly Chihuahua. No obvious environmental barrier exists between their ranges in those areas, hence the nature of their interaction remains to be determined.

The following analyses progress from the northwesternmost enclave (I) clockwise to the southeasternmost enclave (V).

Enclave I. Eight specimens: 5714, 5 km SE Buenaventura (29°52'33.6"N, 107°23'43.0"W), 1692 m, 5 July; 5715-9, Ejido Flores Magón (29°57'34.0"N, 107°6'29.6"W), 1460 m, 6 July; 5739, Ejido Lagartijas, mpio. Ahumada (30°21'23.8"N, 106°46'35.7"W), 1260 m, 6 July; 5807, 5 km W Hwy 45, rd to Namiquipía, 7 July.

Seven males, 54–71 mm SVL, all with a broad (3 scales wide) brown lateral stripe on each side, dorsal area between essentially unicolor, with no or faint evidence of dorsolateral light lines and dorsal dark spots. The semeions are well developed in all. The gular ones are united in all, narrowly in one, a median constriction in one, fused completely in five, light blue with narrow black edging. The abdominal semeions are blue, black-edged, widely separated (~6 scales), not extending anterior to axilla and not or barely reaching thigh.

The female (60 mm SVL) has a more or less unicolor dorsum and sides, except for a dim dorsolateral light line interrupted by narrow, wavy cross lines. Ventral surface white, unmarked except for small pale blue gular semeions, lacking black borders.

In both sexes a narrow midventral dark line of various lengths extends at most from throat to anus, and is especially prominent posteriorly. This feature is present throughout *S. belli* and *S. undulatus*, augmented in intensity and by scattered dark flecks in some subspecies of the latter.

The pattern in this series is clearly that of *S. belli*.

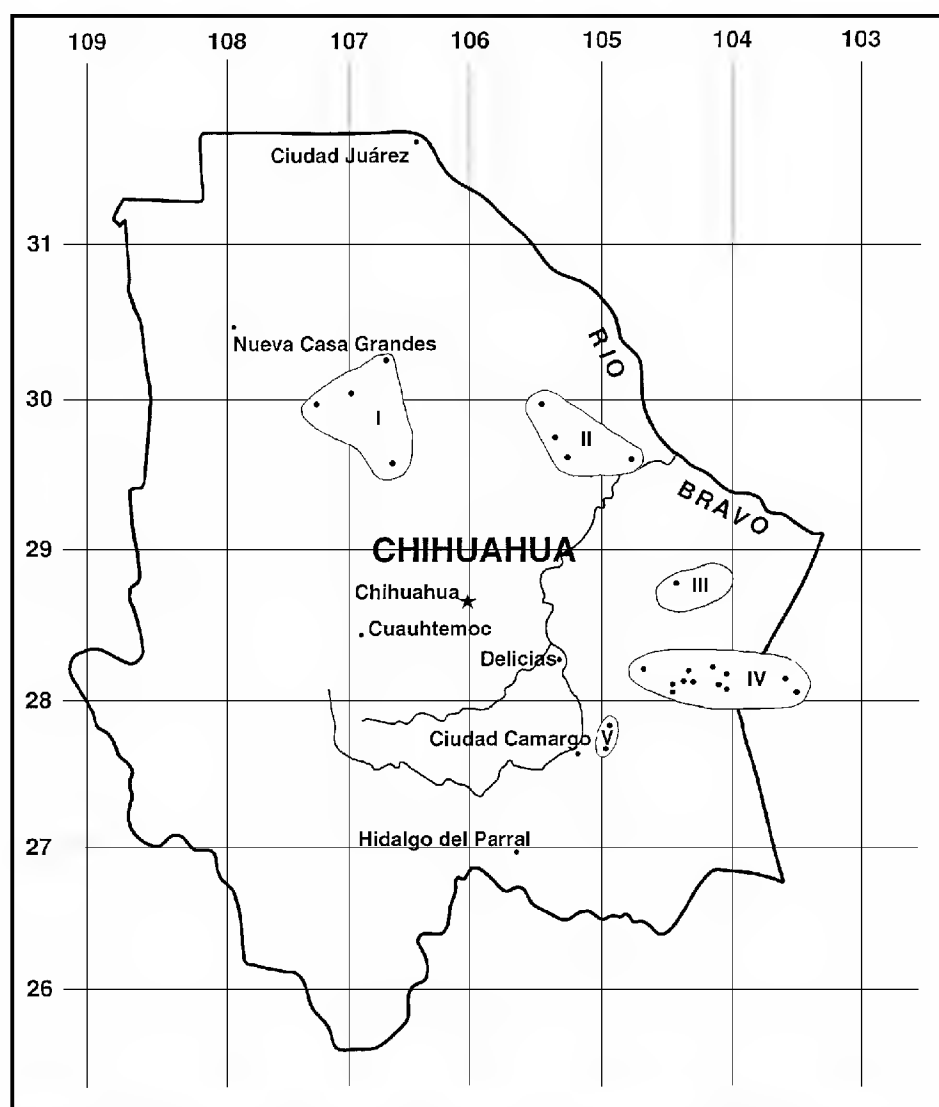


Figure 1. Location of the five enclaves of samples of *S. belli* here reported. See text.

1. Laboratorio de Ecología, UBIPRO, Escuela Nacional de Estudios Profesionales Iztacala, UNAM, Apartado Postal 314, Avenida de Los Barrios s/n, Los Reyes Iztacala, Tlalnepantla, Estado de México, 54090 México.

2. 425 NE 7th Street, Gainesville, FL 32601.

3. Museum of Natural History, University of Colorado, Boulder, CO 80309-0334.

Enclave II. Nine specimens: 5531, Ejido El Álamo on Río Conchos (29°32'16.4"N, 104°52'23.0"W), 939 m, 21 June; 5533, Rancho Santa Lucía, mpio. Coyame (29°32'30.3"N, 105°19'53.3"W), 1534 m, 23 June; 5977-81, Cerros Tres Castillos (29°54'39.7"N, 105°42'13.3"W), 1286 m, 20 July (basking on large boulders at base of mts; 6008, Rancho Alpine (29°46'35.3"N, 105°17'59.2"W), 1607 m, 23 July; 6009, Cerros Santa Anita (29°40'14.1"N, 105°19'13.6"W), 23 July (basking on a large boulder).

One male (5533), 65 mm SVL, has one large, light blue central gular semeion, narrowly bordered by black. The rest of the ventral surfaces and the dorsum are as in males of enclave I.

The eight females, 57–67 mm SVL, each have two small, widely separated faint blue gular semeions; venter as in the enclave I female. Dorsal surfaces with dim dorsolateral light lines, interrupted or not by small, paravertebral dark streaks.

Taken from very close to the range of *S. u. consobrinus* in Presidio Co., Texas, these specimens are nevertheless clearly *S. belli*.

Enclave III. Four specimens: 5398-9, Sierra El Virulento, Rancho El Virulento de Afuera, mpio. Ojinaga (28°45'50.5"N, 104°19'12.8"W), 1775 m, 18 June; 5433, canyons of Sierra El Virulento (28°47'43.1"N, 104°19'1.0"W), 1602 m, 18 June; 5471, sierra N Rancho El Virulento de Afuera, 19 June.

Two males (52–86 mm SVL) have a broadly united, light blue gular semeion, black-edged posteriorly but not anteriorly, although anterior to the semeion the throat is densely pigmented. The dorsum is essentially unicolor, the dorsolateral light lines weak or absent, and the lateral brown stripes distinct.

The females (55–58 mm SVL) have dim dorsolateral light lines interrupted by narrow, dark crosslines in two, not interrupted in the third. Two very small, pale blue gular semeions.

As in the preceding two enclaves, this group agrees with the characteristics of *S. belli*, not *S. u. consobrinus*.

Enclave IV. Seventy-two specimens: 5174-8, stop on brecha [gravel road] Hercules (28°00'20.7"N, 104°31'1.7"W), 1343 m, 12 June; 5194-5202, stop on brecha Hercules, 6 km W entronque Hercules (27°59'6.4"N, 104°34'30.3"W), 1328 m, 12 June; 5230-52, Rancho Espíritu Santo, Sierra Espíritu Santo, 5 km SW Rancho San Francisco (28°2'55.5"N, 104°25'42.3"W), 1384 m, 13 June; 5273-7, Rancho San Francisco, 13 June; 5280-8, 5320-2, 5332-3, 5347-8, Rancho El Gatuno, base of Sierra Encinilla (28°6'51.1"N, 104°5'52.2"W), 1353 m, 14 June; 5339, small granite hill 3 km N Rancho El Gatuno on Sierra Encinilla (28°8'33.0"N, 104°6'22.7"W), 1416 m, 15 June; 5356, sierra N Hercules mine, mpio. Sierra Mojada, Coahuila (28°2'11.8"N, 103°39'14.0"W), 1412 m, 16 June; 5389, El Alicante, Coahuila (27°55'17.7"N, 103°33'57.6"W), 1310 m, 17 June; 6224-5, Ejido Texcoco, mpio. Camargo (28°5'14.1"N, 104°19'28.7"W), 1364 m, 3 September; 6231, El Ranchito (28°1'5.9"N, 104°00'22.0"W), 1268 m, 4 September; 6246-7, Sección Honorato (27°58'32.8"N, 104°4'27.1"W), 1367 m, 6 September; 6248, betw Sección Honorato and Honorato de Abajo

(27°57'53.4"N, 104°5'20.6"W), 1349 m, 6 September; 6249, 6284, 6297-8, Rancho Honorato de Abajo (27°56'47.6"N, 104°6'47.9"W), 1380 m, 6 September; 6279, betw Rancho Honorato de Abajo and Rancho Álamos de Amendariz, 6 September; 6315, Rancho La Victoria (28°2'2.8"N, 104°22'53.3"W), 1433 m, 7 September; 6369, Cerro El Macho, La Perla, 9 September.

Forty are males, 49–54 mm SVL except for a hatchling 27 mm SVL, taken 9 September, and lacking semeions. All others have both gular and abdominal semeions, although the abdominal semeions are scarcely evident in one (52 mm SVL), poorly evident in another (53 mm SVL). Otherwise both semeions are well developed. The gular semeions are united in all except two, in which they are narrowly separated (1–2 scale widths). The union is broad relative to the size of the semeions in most (48), but deeply although narrowly cleft in 12. The abdominal semeions are separated minimally by ~4–6 scale widths.

The dorsum in males is distinctly lighter than the brown lateral stripes, and lacks any clear evidence of spots, the dorsolateral light lines are dim in all except three (including the hatchling), moderately developed in 8, and dim or absent in the remainder.

The 32 females are 44–74 mm SVL except for a hatchling 27 mm SVL, taken 7 September. Sixteen have gular semeions, although visible only under magnification in a few; in all they are a few scales in area and widely spaced. No evidence of abdominal semeions is present but a few have scattered dark dots or streaks, especially on throat. In six females dorsolateral light lines are dim or absent. In all the rest the dorsolateral light lines vary in intensity, but in none are they bright, without interruption.

This series mostly conforms with the characteristics of *S. belli*.

Enclave V. Five: 5213-5, hwy Camargo–Ojinaga, mpio. Camargo (27°46'18.7"N, 104°51'43.6"W), 1319 m, 12 June; 5588-9, Campo de Tiro Camargo (27°35'0.8"N, 104°59'3.7"W), 1288 m, 30 June.

Four are males, 48–57 mm SVL. All have united gular semeions, although very narrowly in one, more broadly in others (1/3 to full), black-bordered only posteriorly. The abdominal semeions are much as described in enclave I. The dorsum is essentially unicolor, the dorsolateral light lines not or scarcely evident. The sides are darker than the dorsum.

The female, 56 mm SVL, has the two very small, widely separated pale blue semeions typical of females of *S. belli*. The dorsolateral light lines are clearly evident, although dull, and are interrupted by paravertebral crosslines.

This series conforms for the most part with expectations for *S. belli*.

Summary. All populations here reported represent *S. belli*. No populations of *S. u. consobrinus* are present. Nevertheless, toward the southeast the populations show some resemblance to *S. u. consobrinus* in smaller size, better development of the

dorsolateral light lines in some specimens, and the occasional separation of the gular semeions in males. On the other hand, the usual fusion of the gular semeions in males, reduction of black bordering on the gular semeions, and the consistent dark lateral stripe in males, require allocation to *S. belli*.

In spite of the sympatry without hybridization of *S. u. speari* and *S. belli* in north-central Chihuahua, trends of variation of *S. belli* eastward in the state are suggestive of possible intergradation with *S. u. consobrinus* in Coahuila still farther east (but not in southern Coahuila; Lemos-Espinal et al., 1998).

Although *S. belli* and *S. u. consobrinus* are currently recognized as different species, they may turn out to be subspecies of *S. undulatus*, as originally proposed. The sympatry of *S. belli* and *S. u. speari* may be a result of circular overlap, where "a chain of intergrading subspecies forms a loop or overlapping circle of which the terminal links have become sympatric without interbreeding, even though they are connected by a complete chain of intergrading or interbreeding populations" (Mayr, 1963: 507-512). Further study of varia-

tion in Coahuila populations of *S. belli* and *S. u. consobrinus* may resolve the question. At present, *S. u. consobrinus* is not known from but presumably occurs in central western Coahuila, but that area remains to be adequately sampled.

Sceloporus virgatus Smith

Sixty-seven specimens: 5598-64, Microondas San Luis, near Sonora border, mpio. Janos (31°19'30.7"N, 108°45'20.8"W), 2074 m, 2 July, in oak-juniper forest. The sexes are approximately equal in number. The longest male is 56 mm SVL, female 66 mm. Twelve females exceed the male maximum. The shortest male is 42 mm SVL, female 45 mm. They conform with Cole's (1963) review, and are well known throughout the area where they were taken.

Acknowledgments

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An Incident of Envenomation from *Heterodon nasicus*

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After having completed the *Heterodon nasicus* species account for the *Catalogue of American Amphibians and Reptiles*, I received a letter from Dr. Harold F. De Lisle at Moorpark College in which he informed me of a incident of a severe envenomation of a man from southern California by a captive *H. nasicus*.

A barefoot, middle-aged male was feeding several *H. nasicus* on the floor of his room when one struck his left ankle and began to chew. He thought it was amusing at first, and did not remove the snake for perhaps 10 seconds. Pain and swelling began within a couple minutes, and emergency medical aid was sought. As far as Dr. De Lisle could determine, only anti-inflammatory chemotherapy was administered.

Edema persisted for three weeks. Subcutaneous hemorrhage was extensive, covering most of the foot, and about 10 cm of the leg above the ankle. Recovery was uneventful, but it was almost three months before tissues returned to normal.

When Dr. De Lisle saw the patient nearly a week after the bite, the aftermath reminded him of a *Crotalus cerastes* bite.

The only other incidences of human envenomation which I have been able to find are in Bragg (1960), Kroll (1976), and Morris (1985). Hornfeldt and Keyler (1987) published a review on the toxicity of *Heterodon* venom.

I am greatly indebted to Dr. Harold F. De Lisle for the privilege of using his data.

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**Book Review: *Life, Love, and Reptiles: An Autobiography of Sherman A. Minton, Jr., M.D.*
Foreword by Kraig Adler, Ph.D. 2001. Krieger Publishing Co., Malabar, Florida.
xvi + 217 pp. ISBN 1-575524-172-2. \$24.50**

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Do elementary school teachers still assign those oral book reports that I had to do? I remember that a popular choice of many boys for these efforts was a biography of a sports star. At that time reading about a person's life did not interest me, but over the years this topic has become one of my favorites. Sherman Minton (February 24, 1919 – June 15, 1999) taught microbiology at the Indiana University Medical School and was able to pursue his deep interest in herpetology both in his spare time and while on various medical assignments throughout the world. He became an expert on snake venoms and snakebite and because of his surveys of Indiana's herpetofauna (1972, revised 2001) most certainly must be considered to be the leading herpetologist in the history of the Hoosier State.

Herpetological historian Kraig Adler points out in his foreword that Sherman Minton's life harks back to the early 19th century when professional biologists were almost always physicians by training. Dr. Adler then provides a nice overview of the nearly 200 pages of well-written prose left for us by Dr. Minton.

In the nine chapters to follow, Dr. Minton describes growing up in New Albany, Indiana, along the Ohio River, his service in the Navy during WWII, and herpetological journeys in Big Bend region of Texas, Costa Rica, Pakistan, Mexico, and other tantalizing tropical locales including the South Pacific and Australia.

Most of his trips were of short duration, but he and his family spent four years in Pakistan. The former British colony gained its independence in the 1958 and he seized the opportunity to teach in the fledgling medical school there and also study the amphibians and reptiles, resulting in several important publications on the region. During that stay he dealt with a case of anthrax and an outbreak of smallpox. No doubt he would take great interest in the state of the world since September 11.

Throughout the book, Dr. Minton's many detailed descriptions of tropical parasites and the diseases they cause brought back warm memories of my undergraduate days at Kent State. There our professor, Benjamin Foote, kept us awake in his Invertebrate Zoology lectures by vividly regaling the terrible woes sure to befall us should we fulfill our dreams and actually visit "the rainforest." And it appears that Dr. Foote kindly spared us something called Bancroftian filariasis (page 25) a malady that certainly would have given us males cause for grave concern. And perhaps our girlfriends too!

Most of us have cruised roads and tramped all sorts of habitats in search of herps. Few of us though have discovered

new species in these activities, as did Dr. Minton. He also became an accomplished scuba diver, a wonderful hobby when used for simple enjoyment but a very useful skill when chasing sea snakes.

Many of the herps Dr. Minton describes will be familiar, whereas others will send you to the library stacks or World Wide Web. Amazingly, leopard geckos were little known when he was in Pakistan. Oh, how times have changed. I guess because of their personality, tokay geckos have stayed the same price in pet shops since I obtained my first and only one in 1971. Through Dr. Minton, I learned that American servicemen described its call very differently than anything I've ever heard previously. Because I doubt whether my CHS editor will allow me to quote this over-used cable TV and R-rated movie expletive in this publication, I'll just refer you to page 157.

St. Valentine's Day has just passed: don't overlook that a key word of his book's title is "love." That refers to all of his female family (three daughters) but especially to his wife. He suggests that the day he met Madge Rutherford, November 13, 1937, while a shy student at Indiana University, was the most important day of his life. She was a WASP during the war and has had a lifelong interest in aviation. Throughout their marriage she was his constant companion both at home and in the field and in fact served as co-author of two of his most popular books, *Venomous Reptiles* (1969) and *Giant Reptiles* (1973). In the month of his birthday, I'm sure he is terribly missed.

In the book's final chapter, "Retrospective," fellow physician/herpetologist and longtime friend H. Bernard Bechtel fills in some gaps that Minton had left out. These include additional travels, awards, and the factors leading to his death.

Although not inexpensive, this very well-made book is hardbound with an attractive cover and overall design. The paper feels durable. Mostly high quality, black and white photographs chronicling his life are sprinkled throughout. A collage of similar photos covers the front and rear end papers. I especially liked the vignettes from his herpetologist friends and the inclusion of Dr. Minton's 200+ published works. Indexing must be costly because that feature is missing, much to my dismay. Maps would have been very helpful but I kept my *National Geographic Atlas* nearby. The only errors I found were typos on page 51 ("mrs." instead of "Mrs."), page 114 (the bird is water ouzel, not onzel; naturalist John Muir is probably rolling in his grave!), and perhaps a slight grammar problem (misplaced "and"?) in the first full paragraph on page 160.

Unfortunately, although I live in the state next door, the only contact I had with Dr. Minton was a single occasion at a SSAR meeting (Ann Arbor in '88 or Penn State in '91?). There I found him to be very approachable. I relish autographed books so I asked him if he'd sign the stack of his works I carried with that goal in mind. In my copy of his first edition of *Amphibians and Reptiles of Indiana* he inscribed: "Hope you enjoy this. I enjoyed writing it."

I wish I could also have gotten this latest book autographed, but the manuscript was unknown until being discovered after

his death. Kudos for Krieger for publishing it and for the team of family and friends, especially editor Breck Bartholomew, for assembling it. I greatly enjoyed reading it, but probably not nearly as much as "Sherm" did writing it, and more importantly, living it. I hope that other professional herpetologists we amateurs admire will follow suit and also share their joys, struggles, and adventures with us. Anyone interested in herpetology and remarkable life spent pursuing it will want to read this book. Keep it on a nearby bookshelf for a later time when you again need to be inspired and reminded about two very important aspects of our lives: love and reptiles.

Further Reading

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Karns, D. R. 2000. Sherman A. Minton, Jr. 1919-1999. *Copeia* 2001:891-894.

Stewart, M. M. 2000. Historical perspectives: Madge and Sherman Minton. *Copeia* 2000:304-309.

Bull. Chicago Herp. Soc. 37(2):33-35, 2002

HerPET-POURRI

by Ellin Beltz

Burmese kills Colorado man

A Colorado man died of asphyxiation caused by his 11-foot-long, 43-pound female Burmese python, according to the Arapahoe County Coroner's autopsy report. The man had been warned by authorities to get rid of a snake which was "too large" in 1998. His girlfriend and her cousin were in the home when the man was strangled. The cousin saw the man with the snake around his shoulders, then it tightened its grip around the man's neck. The women tried to pull the snake off, and followed all instructions given by 911 but they were unable to stop the snake from constricting the man to death. "He was bleeding from his nose and mouth. . . . We thought it was our fault at first," said the girlfriend, and added "Everybody was blaming us, saying we didn't do more. We did everything we could." Keeping a snake that size is illegal in the state of Colorado — except at the zoo. [*Denver Post*, February 12 and 13, 2002, from S. L. Barten and Wes von Papineäu]

Not her usual squeeze?

A woman in Norfolk, England, offered to feed her boyfriend's python (which he had named for her), but the 15-foot snake grabbed her and began to constrict her leg. She dragged herself to the door where someone saw her and called for rescue. "[The snake] dropped the bird I was feeding her with so I went to pick it up for her, but I think she got hold of my leg by mistake. I was shocked at how quickly it happened and I could see the blood dripping down my leg," the woman said. The incident has led to a review of the effectiveness of laws governing exotic pets and authorities have found that only 39 people in the region had bothered to get the permits. The snake was being kept in a 6 × 3 foot enclosure, heated and lit, but a Royal Society for the Prevention of Cruelty to Animals inspector called the circumstances "less than ideal." The man

went out and bought another 10-foot python after the 15-footer was taken to an animal shelter by authorities. His girlfriend said they're going to buy a bigger cage for the new snake. [*Eastern Daily Press*, Norfolk United Kingdom, January 29, 2002, from Wes von Papineäu]

Hot tip?

A 5-foot iguana bit off the tip of a 14-year-old boy's finger as he was playing with his new pet in the family backyard. He had purchased the reptile the day before. Believing that the iguana may have swallowed the digit tip, police shot and killed it and the firefighters gutted it, but no finger was found. The rescuers then put on thermal imaging gear and found the finger tip lying in the dirt and sent it to the hospital where surgeons waited to sew it back on. [2002: *Miami Herald*, January 16, and the Fort Lauderdale *Sun-Sentinel*, January 15 — Wes von Papineäu, Alan Rigerman and Bill Burnett's mom]

Scavengers or killers?

"On January 16, police officers entered the apartment of . . . [a 42-year-old man], of Newark, Delaware, and found seven Nile monitor lizards feeding on his corpse. An autopsy proved inconclusive as to whether the monitors, ranging up to six feet long, had killed their owner." [*New York Times*, February 12, 2002, from J. N. Stuart and Wes von Papineäu] The debate immediately started online and in the press among lizard keepers, some saying the animals must have just found the owner deceased and being hungry began eating. Which all just begs the question of why the monitors were loose in the first place.

Iguana on vacation?

"A 3-foot iguana was captured . . . by a maintenance employee at the Turtle Bay Hilton Golf and Tennis Resort in Kahuku,

Hawai'i. . . . Officials could not say whether the lizard was wild or had been a pet. . . . [While] iguanas may have established a presence in and around Waimanalo, it is [still] rare to find one in the wild. . . . It is illegal to possess or transport an iguana in Hawai'i." [*Honolulu Advertiser*, January 3, 2002, from Ms. G. E. Chow]

Breeding reptiles and amphibians

- A Georgia frog farmer who has studied frog farms in 31 other countries has developed a system that he says will grow a bullfrog to an edible half pound or so, in just 180 days. In the wild it can take two or three years for a frog to reach this size. The farmer separates all the frogs, so they don't eat each other, and feeds them frog pellets using techniques he learned overseas as well as methods he developed himself. Usually frogs only eat live food. You can see his operation and read more about it at <<http://www.kens-fishfarm.com>>. [Bucyrus, Ohio *Telegraph-Forum*, June 19, 2001, from Bill Burnett]
- A company based in Montevallo, Alabama, breeds lizards in a hot, humid nursery surrounded by hundreds of open-air pens. The owner is a 57-year-old former physics teacher, travels and collects breeding stocks which his wife (a nurse) helps take care of in their facility. [Houma, Louisiana *Courier*, June 26, 2001, from Ernie Liner]

Texas-style Turkey

"The self-styled 'Texas Snakeman,' crawled into a sleeping bag containing 109 rattlesnakes to set a new record. 'I would have gone higher, but we ran out of snakes,' [he said]. . . . He's been receiving calls from Europe and Japan to put on snake-handling demonstrations and stunts. 'I'm ready to do what I do almost any time,' he claims, 'I'm like lunchmeat—I'm always ready.'" [*Parade Magazine*, December 30, 2001, from Ray Boldt]

Like, I'm so scared . . .

"No one is safe! Leaping turtles invade U.S. Snapping reptiles chomp you where it hurts!" The accompanying photo shows two sea turtles (amateurishly clipped by some computer program from a picture where they were swimming) apparently biting a person (possibly female) in a couple of painful places. Inside the text reads, "In a nightmare scenario long dismissed by experts as unlikely, hordes of leaping, snapping turtles with powerful jaws have scuttled north out of the jungles of Panama and Mexico into Southern California and Texas, endangering anyone and everyone in their path as they follow their instinct to attack their prey in the most tender and vulnerable of places. . . ." Another photo shows how people "run for their lives" followed by more cut-and-paste sea turtles. [*Weekly World News* (who else?), December 18, 2001, from Ray Boldt]

Turtle update

For an update on the thousands of turtles confiscated in Hong Kong and being cared for in Florida, click on <<http://www.chelonia.org>>. [Allen Salzberg, <<http://www.herpdigest.org>>]

Egg-celent!

"A Chongwe man who picked eggs from a bush thinking they were a guinea fowl's and put them under a brooding chicken, was shocked when they hatched six tortoises." [*The Times of Zambia*, February 1, 2002, from Wes von Papineau] The tortoises will be released in appropriate habitat.

Best Herp Websites Wanted

"Tim Halliday and I are issuing a new edition of our *Encyclopedia* first published in the UK in 1986. I am now completing an expanded bibliography and wish to include the addresses of the best herp web sites. I am not in tune with most of these and certainly cannot judge which are best. I would very much appreciate your opinions (and the relevant addresses). Thanks very much for your help. Kraig Adler, Professor of Biology and Vice Provost for Life Sciences, Cornell University, W339 Seeley G. Mudd Hall, Ithaca, New York 14853-2702, fax 607-254-4308, E-mail <kka4@cornell.edu>

Any ideas?

"I am writing you regarding the World Congress of Herpetology [WCH]. As you know the Fourth World Congress of Herpetology [4WCH] was held last December in Sri Lanka. During the business meeting several people voiced an interest in having the Fifth World Congress [5WCH] in the New World. To date, the previous four congresses have been held in Europe (twice), Australia, and Asia. The main problem with having the 5WCH in the New World is that no local committee has been formed or submitted a formal bid to host the meeting. Since returning from the 4WCH I have contacted several people regarding the possibility of holding the 5WCH in North America. These people include all four of the WCH General Secretaries (past and present) as well as other interested parties. So far the reception of this idea has been mixed, and not entirely encouraging. . . . In order to speed up my pursuit of a local committee to submit a formal bid to host the 5WCH, I have created a web site and a discussion forum. The web site: <<http://www.herplit.com/5WCH>> simply contains the WCH Constitution as well as a link to the discussion forum: <<http://forum.onecenter.com/herpbooks/>>." Breck Bartholomew <<http://www.herplit.com>> E-mail <breck@Herplit.com>

Thanks for the coffee, mon!

After much debate about how to kill the introduced Puerto Rican coqui frog on various Hawaiian islands, it has been determined that the frogs are probably breeding too fast for any form of eradication program to work, according to the state Department of Agriculture. The frogs can occur in densities up to 10,000 per acre and have been found on 226 Big Island sites (11 in 1998), 41 sites on Maui, 21 on Kaua'i and 20 on O'ahu. [*Honolulu Advertiser*, September 28, 2001, from G. E. Chow] The Agriculture Department still plans to try the caffeine sprays previously reported, but local people are forbidden from spraying caffeine, even on their own property. A few years back, we reported that caffeine has amazing powers to linger on in the environment—apparently it's a powerful toxin for small invertebrates, frogs and some fish.

One expensive garter snake

"A transit agency will have to pay \$1 million to a contractor for stopping a construction project for 18 days so wildlife officials could investigate the death of a rare snake. . . . Work on the Bay Area Rapid Transit extension project near San Francisco International Airport was halted after the dead San Francisco garter snake was found. . . . BART has already spent close to \$6 million to comply with environmental laws and has relocated more than 75 snakes." [*Albuquerque Jour-*

nal, October 27, 2001, from J. N. Stuart]

Thanks to everyone listed above and to Alan Rigerman, Ernie Liner, Ray Boldt, Ms. G. E. Chow, J. N. Stuart, Bill Burnett, Marty Marcus, K. S. Mierzwa, Mrs. P. L. Beltz and everyone else who ever has or ever will send in a clipping for this column. Send whole pages with the name/date and your name on each piece to: Ellin Beltz, P.O. Box 934, Ferndale, CA 95536-0934 or E-mail <ebeltz@ebeltz.net>.

Unofficial Minutes of the CHS Board Meeting, January 18, 2002

Vice-president Lori King called the meeting to order at 7:42 P.M. Board members Dan Bavirsha, Jack Schoenfelder and Jenny Vollman were absent.

Officers' Reports

Recording Secretary: Emily Forcade distributed and read the minutes for the December board meeting. The minutes were accepted as read.

Treasurer: Greg Brim distributed the final report for 2001. The year started and ended with a modest decline in funds. More expenses have come in for the Midwest Herpetological Symposium but there continues to be a net profit.

Membership Secretary: Mike Dloogatch distributed a membership report for the year 2001. We ended the year with a five-member increase. He noted several times when membership had a greater rate of increase. In November and December 2001 (and also in March 2000) the increase was probably related to grant applications. In April the increase was probably related to ReptileFest. We need to print new membership applications to reflect the upcoming change in the address of the CAS.

Vice-president: Lori King reported that a folding screen will continue to be needed for the general meetings from January through March. Ron Humbert offered to take care of the rental of a 9-foot screen. The CHS sent some items to Joe Wasilewski in Florida for a fundraiser for Chinese alligators. The Turtle Survival Alliance did very well in getting all the confiscated Asian turtles out of Hong Kong. The TSA still needs funds to help pay for this effort.

Corresponding Secretary: Steve Sullivan said that the auditorium would not be available at all in 2002 for general meetings. He received a request from a Cub master in Mount Prospect for some animals to be brought to an evening meeting. Ron Humbert volunteered to look into this. Ron Humbert and Jenny Vollman are also taking care of a request for animals by the Friends of the Oak Park Conservatory. Steve received a message from someone asking how much of a contribution is being made by a Sustaining Member or a Contributing Member. Mike Dloogatch will call this individual. For tax purposes anything over \$22 is deductible. Steve will be sending letters to potential contributors to the raffle. Greg Brim will

provide him with a list of names of current contributors. Lori said that when the Turtle Survival Alliance was looking for funds to charter planes to carry the turtles out of Hong Kong recently, United Airlines donated the flights for free. She said that Emily Forcade had suggested we bombard United with thank-you letters. She asked that Steve draft a letter to them. Bob Herman wondered if there wasn't a good story that could come out of this in which United could be identified.

Publications Secretary: Mike Redmer asked if anybody wanted to do a book review. Between them, he and Mike Dloogatch have three or four reviews promised. Mike said that when we put these on our website, it will be good for our association with Amazon.com.

Standing Committees

ReptileFest: Darin Croft said that there would be a planning meeting on February 3 at Mike Dloogatch's office for anyone interested in working on the 'Fest. Linda Malawy has agreed to work on getting other local nonprofits to exhibit. Exhibitors will get tickets for meals to take directly to the concession stands. Jenny Vollman has been in contact with someone from the *Daily Herald* who will put in an ad for the 'Fest. Ari Herman has provided some new photographs of last year's 'Fest. Ron Humbert has requested a donation of cages from Bush Herpetological. These could possibly be used for the Peggy Notebaert CHS exhibit as well. Steve Sullivan asked about an E-mail version of the 'Fest flyer. Darin said that there is one in the PDF format.

Grants: Mike Redmer said that he, Lori and Mike Dloogatch have many good applications to review in the coming month.

Shows: Lori King said that from March 15 to May 31 Paul Sereno will have a SuperCroc exhibit at the Museum of Science and Industry. This is an opportunity for us to be there on weekends for crocodilian talks and more. Dan and Bob Bavirsha and Jim Nesci can be potential resources.

Raffle: There continues to be no one interested in taking over the raffle. Ron Humbert and Linda Malawy will run the January raffle. Ron said he would continue to store the heavy items. Linda suggested that we solicit some non-reptile-related items to appeal to people who are attending meetings, perhaps guests of members, but not interested in herps themselves.

Ad Hoc Committees

Notebaert display: Ron Humbert said that we might be able to do something for May, although it wouldn't be in final form. Lori King suggested we come up with a basic idea and then discuss it with the design staff of the CAS. Ron said it needs to be set up quickly and also needs to be something that doesn't require being manned daily. Lori said some of Gary Fogel's cordylids would meet those requirements. Linda Malawy knows about two red-tailed boas that have been used as display animals and are available to us. Steve Sullivan said the Museum has the ability to house these animals. Ron said he is waiting to hear from Bush Herpetological. The CAS is ready to provide us with three 55-gallon aquariums.

Salamander Safari: This outing will begin at 9 A.M., March 23, at the Middle Plum Creek Preserve in Will County. We will also have the use of the newly renovated Plum Creek Nature Center. Ron said people are encouraged to bring amphibian displays. Ton Anton said that a whole range of salamanders, frogs and snakes may be sighted there, among them Kirtland's snake, spring peepers, and blue-spotted salamanders.

Old Business

Animals of the Month: February—toads; March—salamanders. Chicago Wilderness: CW would like to publish a Chicago area poster of amphibians. They would like CHS involvement. Mike Redmer said we have been acknowledged in the annual report of the Chicago area Audubon society in association with Chicago Wilderness for our contribution to the funding of the frog call CD. Mike Redmer said that Chicago Wilderness might be able to help identify external sources of funding which would allow us to expand our grant program. He said that if we want to draw on CW resources we need to partner with another member organization of CW. There are many such organizations.

New Business

There was some discussion of the concept of an Illinois state reptile.

Round Table

Jim Hoffman asked if E-mails were being received by everyone on the CHS listserve. It appears that none of the AOL members are receiving them. If the board doesn't have a problem with the full list of recipients being mentioned, this would be a way of getting past what is probably a spam filter.

Ron Humbert said he would be donating to the raffle a picture of John Edwards Holbrook (a man who needs no introduction), the Father of North American Herpetology.

The meeting was adjourned at 9:33 P.M.

Respectfully submitted by Recording Secretary Emily Forcade

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Herpetology 2002

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

TAXONOMIC REVISION OF THE GENUS *CLEMMYS*

J. A. Holman and U. Fritz [2001, Zoologische Abhandlungen Mus. Tierkde. Dresden 51(20):331-353] suggest because of convincing evidence for paraphyly of the genus *Clemmys*, that the genus be restricted to its type species, *Clemmys guttata*. *Clemmys marmorata*, a species more closely related to emydid taxa with a hinged plastron than to other species with nonhinged plastron previously referred to *Clemmys*, is treated as a member of the monotypic genus *Actinemys* Agassiz, 1857. *Clemmys insculpta* and *Clemmys muhlenbergii* are regarded as representing another distinct genus for which the name *Glyptemys* Agassiz, 1857, is given precedence over *Calemys* Agassiz, 1857, erected for *Testudo muhlenbergii*.

Based on a large amount of fossil material from Nebraska, a new species, *Glyptemys valentinensis*, is described. The specific name refers to the Valentine Formation in Nebraska, where the type material was collected. With this new species, the genus *Glyptemys* is now known from the Middle Miocene (ca 14.5–11.5 Ma BP) to modern times. *Glyptemys valentinensis* is morphologically more similar to *Glyptemys insculpta* than to *G. muhlenbergii*. It is suggested that *G. valentinensis* gave rise to *G. insculpta* between 11.5 and 5.5 Ma BP. As sequence data of the mitochondrial cytochrome *b* gene argue for a differentiation of *G. insculpta* and *G. muhlenbergii* ca 14.5 Ma BP, *G. valentinensis* could be the last common ancestor of *G. insculpta* and *G. muhlenbergii*.

LIFE-HISTORY TRAITS IN A TEMPERATE SKINK

E. Wapstra and R. Swain [2001, J. Herpetology 35(2): 194-203] investigated geographic and interannual variation in life-history traits in two populations of the Tasmanian spotted snow skink, *Niveoscincus ocellatus*, living at the climatic extremes of the species' distribution. Within each population, there were no interannual or intersexual differences in adult body size. However, mature individuals from a cold subalpine/alpine site were significantly larger at maturity, and had a larger maximum body size than mature individuals from a warmer coastal site. These findings are consistent with current predictions of the proximate effect of the thermal environment on lizard growth and size and age at maturity. In both populations, female fecundity was size-related. Litter size did not vary between years at either site, but, contrary to expectations, females from the cold site had the same or higher size-adjusted reproductive output as those from the warm coastal site. The authors suggest that resource availability is high at both sites and that a high reproductive output by females from the cold site does not confer a significantly higher survival risk than a lower reproductive commitment. Offspring were largest at the cold site, which is consistent with variation in offspring size of other widespread species and may occur because of strong selective pressures on early survival and growth at the cold site.

A FIELD STUDY OF THE BLACK KINGSNAKE

L. N. Jenkins et al. [2001, Herpetological Natural History 8(1):57-67] provide natural history information including home range and movements, growth rates in the wild, and cloacal autohemorrhaging on black kingsnakes (*Lampropeltis getula nigra*). Long-term mark-recapture techniques, including coverboards and radiotelemetry, were used to study a population of *L. g. nigra* in eastern Tennessee. Over the 6-yr period of the study, 730 captures of 12 snake species were recorded. Neither total nor individual *L. g. nigra* captures differed significantly among the years of this study. Because of a 55% recapture rate and multiple-year capture records on 32 individuals, the authors were able to analyze growth rates and provide estimates of age group size ranges. Growth rates were highest in first year snakes and decreased thereafter. There was no difference between the sexes in SVL or mass, but mature males (> 60 cm) had longer tails than females with equivalent SVLs. Mean SVLs did not vary among most years. Regurgitation at capture provided information on the size of prey items for this species. A behavior known as cloacal autohemorrhaging, previously not described for *L. g. nigra*, was recorded during this study. When captured, certain individuals protruded a bright red cloaca and released cloacal contents, including variable amounts of blood. Twelve individuals were radio-located a combined total of 849 times over a 4-yr period. Mean home range and distance per move for males were significantly larger than those for females. Monitored snakes made no apparent move on 338 of 796 tracking days. Individuals traveled considerable distances only to return to previous locations. During a 26-h survey of two male snakes, body temperatures varied only 3.5°C and 7°C during a period in which the ambient air temperature varied 20°C.

SPOTTED TURTLE SEASONAL ACTIVITY

T. Haxton and M. Berrill [2001, J. Herpetology 35(4):606-614] studied seasonal activity of spotted turtles (*Clemmys guttata*) at the northern limit of their range in central Ontario over two years using radiotelemetry. Prior to this study, and a concurrent study in 1996 on a northern population in Georgian Bay, most reports were based on spotted turtle populations from southerly populations. In the present study, six spotted turtles were tracked in 1994, and nine were tracked in 1995. Turtles emerged from hibernation early to mid-April and remained active until late October/early November, for 197 days in 1994 and 202 days in 1995. Average daily movement was greatest early in the season and generally declined as the year progressed. Spotted turtles were easier to observe earlier in the season compared to later in the year despite still being active. Droughtlike conditions in 1995 may have stimulated the turtles to aestivate. Results from the two northern studies are complementary. Spotted turtles at the northern portion of their range are active longer than those in southerly populations.

FOOD INTAKE OF A SIT-AND-WAIT LIZARD

S. L. Weiss [2001, *Herpetologica* 57(2):138-146] tested the effect of reproduction on food intake of the striped plateau lizard, *Sceloporus virgatus*, a sit-and-wait foraging lizard with a high relative clutch mass (RCM). He maintained male–female pairs in outdoor enclosures throughout the production of females' single annual clutches, observed feeding behavior during methodical feeding trials performed thrice weekly, and related both male and female feeding behavior to the reproductive state of the female. Female food intake was significantly reduced during gravidity, relative to that during vitellogenesis and following oviposition. This reduction was due to decreases in both the frequency and the size of meals. A limitation of abdominal space due to maximization of current reproductive output (i.e., filling the abdomen with eggs) may largely regulate this relationship in species with high RCM; other mechanisms may regulate the same relationship in species with relatively low RCM. Male food intake was significantly less than that of females when females were vitellogenic and receptive to male courtship. During female gravidity, male intake was significantly greater than that of females. No sex differences in food intake were observed after females oviposited. These differences in male and female feeding behavior can be significant components of the differences in reproductive investment between the sexes.

BOG TURTLE HOME RANGES

J. L. Morrow et al. [2001, *J. Herpetology* 35(1):68-73] studied the home ranges and movements of 50 bog turtles (*Clemmys muhlenbergii*) at two sites in Harford County, Maryland, from April 1996 to August 1997. The sites differ in size, land use, and stage of vegetative succession. One site (HA406) was intensively studied 17 years ago. Using radiotelemetry, the authors located turtles twice a week during the active season. Individual turtle home ranges varied from 0.003 ha to 3.12 ha with considerable variation between sites and years. There were no significant differences in home range size or movements between sexes or seasons (mating vs. postmating), although males had larger home ranges during the mating season. Many turtles at site HA406 had home ranges far larger than the average home range reported in the earlier study. An expansion in turtle home ranges may suggest a decrease in site quality resulting from invasion of multiflora rose. Some turtles moved out of their wetlands and across barriers, a finding that demonstrates the importance of appropriate habitat in corridors that connect populations.

AN AQUATIC BOLITOGLOSSINE

D. B. Wake and J. A. Campbell [2001, *Herpetologica* 57(4):509-514] describe *Pseudoeurycea aquatica*, a new species from the northern versant of the state of Oaxaca, Mexico. This is the only aquatic species of bolitoglossine salamander known. Besides its aquatic behavior, this species differs from congeners by having very long legs, a triangular shaped head with nostrils that can be completely closed, and relatively few maxillary teeth. This remarkable new species of salamander may have become extinct over two decades ago.

MIDWIFE TOAD FEMALE COURTSHIP CALLS

J. Bosch and R. Mgrquez [2001, *J. Herpetology* 35(4):647-652] describe a female courtship call, a vocalization produced before amplexus, by female Iberian midwife toads, *Alytes cisternasii*, in response to calling males. They recorded a large sample of female responses to synthetic calls imitating male calls in two-speaker phonotaxis playback tests. Female courtship calls were tonal calls similar to male advertisement calls but shorter in duration. Courtship call duration by both sexes was negatively correlated with body temperature of toads. Unlike male advertisement calls, which were always a single note, female courtship calls comprised a sequence of 1–5 different notes; note duration of the last note was longest. Both duration and dominant frequency were much more variable in female courtship calls than in male advertisement calls. No correlations were found between female body size and call characteristics.

ORIGINS OF STRANDED LOGGERHEADS

K. Rankin-Baransky et al. [2001, *J. Herpetology* 35(4):638-646] report that loggerhead turtles (*Caretta caretta*) inhabit coastal waters of the Atlantic between Virginia and Massachusetts on a seasonal basis, but the nesting populations that rely upon this foraging habitat have not been determined. This study examined mitochondrial DNA control region sequences to determine the origin of 82 stranded loggerheads, comparing their haplotypes to those observed among major nesting colonies of the Atlantic and Mediterranean. The results indicated that the stranded animals originated from three demographically independent nesting areas: northeast Florida/North Carolina (25%), southern Florida (59%), and Quintana Roo, Mexico (16%). The data provide a demographic link between nesting populations and the Atlantic coast feeding ground aggregate and indicate that strandings in the northeastern United States remove individuals from these three nesting colonies, two of which show evidence of serious decline.

SNAPPING TURTLE RIGHTING RESPONSE

A. C. Steyermark and J. R. Spotila [2001, *Copeia* (4):1050-1057] observe that among-individual variation in locomotor performance can have important fitness consequences. In turtles, the duration of the righting response, or the time it takes an individual to return to a prone position after being placed on its carapace, is a trait with possible ecological significance. In this study, the authors quantified righting response time for 21 juvenile snapping turtles (*Chelydra serpentina*) at three testing temperatures and for an additional 254 juvenile snapping turtles representing 24 clutches at 30°C, and examined effects of testing temperature, egg size, egg incubation temperature, and clutch identity on among-individual variation in righting response. Righting response times ranged from 1 sec to over 900 sec. Testing temperature and clutch identity affected righting response time, whereas egg incubation temperature and egg mass did not. Righting response time was consistent across individuals and clutches. These findings suggest that investigators should include clutch as an important variable in behavioral studies of turtles.

INCUBATION OF COBRA EGGS

X. Ji and W.-G. Du [2001, J. Herpetology 35(2):186-194] examined in the laboratory the effects of thermal and hydric environments on incubating eggs and hatchling traits of *Naja naja atra* collected from a population near the northern distributional limit of the species in Zhejiang, eastern China. Eggs were incubated at temperatures of 24, 26, 30 and 32°C on substrates with water potentials of 0 and -220 kPa using a 4 × 2 factorial design. Temperature strongly affected hatching success, incubation length, water uptake by eggs during the course of incubation, and most morphological hatchling traits examined; it even affected embryonic mobilization of inorganic material from the shell. Hatching success was higher at 26 and 30°C but lower at 24 and 32°C. Eggs incubated at 26 and 30°C produced larger and heavier hatchlings that also contained more inorganic material and energy than did eggs incubated at lower and higher temperatures. Hatchlings from eggs incubated at 24 and 32°C were similar in size and mass, but hatchlings from eggs incubated at 32°C had larger residual yolks. Deformed hatchlings were found at 24, 30 and 32°C, the frequency being independent of incubation temperature. At the time of hatching, shells from eggs incubated at 24°C had greater dry mass and contained more ash, suggesting that less inorganic material was withdrawn from the shell by embryos developing at 24°C. Compared with temperature, water potential was not an important source of variation for the hatchling traits examined, although it did influence water uptake by eggs during incubation and hatching success at 24°C. The effects of temperature were independent of the effects of water potential. Variation in size and mass induced by incubation temperature may be important to posthatching survival and fitness of hatchlings.

NORTHERN PACIFIC RATTLESNAKE ACTIVITY

R. L. Wallace and L. V. Diller [2001, J. Herpetology 35(4): 583-589] monitored emergence, egress and ingress of a population of *Crotalus viridis oreganus* from 1982 through 1990 at a hibernaculum in north central Idaho. Snakes were captured by hand and by drift fence traps throughout their active season. They made 1071 field observations of snakes, of which 493 (235 males, 258 females) were individually identified and 578 were observed but their identity was not determined. Estimated median maximum period of activity was 206 days (1 April to 21 October). Mean date of first emergence was not significantly different for males and females, and there was no significant difference in mean spring emergence date among adult, immature, and newborn snakes. Hand captures of mature males occurred mostly in spring and fall. This pattern differed significantly from that of mature females, who had three peaks of captures: spring, summer, and fall. Captures of snakes in drift fence traps generally began a month later than the first hand captures in spring, but the last captures in fall occurred approximately at the same time for both methods. Most captures of mature males in drift fence traps occurred in summer. The authors suggest that the hibernaculum was located within the summer feeding range of this population of *C. v. oreganus*. The study showed a longer active season than might be expected based on latitude and altitude of the hibernaculum.

A NEW TORTOISE FROM THE NEGEV DESERT

J. Perälä [2001, J. Herpetology 35(4):567-582] reports that examination and analysis of over 140 specimens of the endangered tortoise *Testudo kleinmanni* from all areas within its historical distribution on mainland Africa and the Levant confirmed the existence of two allopatric species in this region. He describes a new tortoise species, the Negev tortoise, *Testudo wernerii* occurring east of the Nile delta, and restricted today to the Negev desert (Israel) and to northern Sinai (Egypt). The new species has typically a rounded, considerably wide midbody and a very wide posterior carapace combined with very narrow vertebrals, a relatively modest elevation of the anterior plastron lobe, a gently sloping upper carapacial arch, which is posteriorly depressed, relatively flared, serrated edges of free marginals, a flared supracaudal in both sexes, usually not running in parallel with the posterior carapacial arch, and a short supracaudal in females, among other readily verifiable characteristics. Reflecting these relatively great differences in shell morphology, the new species differs from *T. kleinmanni* by 17 (male) and 18 (female) morphometric character ratios. The new species is additionally fully diagnosable by using Principal Component Analysis and Linear Discriminant Function Analysis with cross-validation. The previous lectotype designation for *T. kleinmanni* was not based on a syntype and is, therefore, invalid. A new lectotype is designated. Both species are endangered because of loss of habitat and other anthropogenic factors. The new species is additionally threatened by an introduction program involving the release of confiscated *T. kleinmanni* into northern Sinai.

SAMPLING TEXAS TORTOISES

R. T. Kazmaier et al. [2001, J. Herpetology 35(3):410-417] note that techniques to assess population changes in reptiles across large landscapes are a conservation and management need. They studied a population of Texas tortoises (*Gopherus berlandieri*) on a large study area (6150 ha) of contiguous thornscrub vegetation in southern Texas from 1990 to 1999. The authors examined cohort and temporal variation in capture probabilities; and estimated survival, population size, and λ (finite population growth rate) for this population of Texas tortoises. They captured 2128 tortoises a total of 3132 times during the study period. The distribution of the frequency of captures by sex varied during the active season and across years, but annual capture probabilities were similar between sexes. The ratio of juveniles to adults varied by a month-by-year interaction. Tortoises exhibited a temporary response to marking that was modeled in survival analysis. Capture probabilities of adult tortoises on an annual basis ranged from 0.12 to 0.38, and annual survival rate of adults was estimated to be 0.79 ± 0.05 . Density of the adult population was estimated at 0.26 tortoises/ha, a level of magnitude lower than previous work conducted on habitat islands. Lambda (population growth rate) was estimated to be 0.981 (95% confidence limits: 0.945–1.019) from a Jolly-Seber model. Road-cruising was an effective large-scale method for population monitoring of the Texas tortoise in the study area and may prove useful in thornscrub habitats that compose the majority of its geographic range.

OBSERVATIONS ON SOFTSHELL TURTLES

P. C. H. Pritchard [2001, *Chelonian Conservation and Biology* 4(1):5-27] notes that the living softshell turtle species of the family Trionychidae, approximately 25 in number, show relatively low levels of sympatry, and offers the hypothesis that, when gross sympatry does occur, direct competition between the species in question may be mitigated by possible character displacement manifested, *inter alia*, by divergence in adult size. Such divergence, when correlated with certain other changes, including development of exaggerated plastral callosities and other specializations for surviving drought conditions, as well as salinity tolerance, carapacial pankinesis, and feeding specializations ranging from piscivory to molluscivory, probably facilitates the utilization of different microhabitats and feeding niches by various trionychid species within the same general area. Examples of the resulting gross sympatry exist in North America (*Apalone spinifera* and *A. mutica*) and Africa (*Trionyx triunguis*, *Cyclanorbis elegans* and *Cyclanorbis senegalensis*), but reach their greatest degree in Asia, where the small or medium *Lissemys*, the large *Aspideretes*, and the giant *Chitra* are grossly sympatric in much of the Indian subcontinent, and culminating in the *Amyda–Dogania–Chitra–Pelochelys* assemblage in a small area of western Thailand and in eastern Java. In that the data for maximum size of each of the extant softshell species in the last thorough review of the Trionychidae were presented very conservatively, these are reevaluated in the light of new size records for many of the species. A breakdown into general categories of small, medium, large, and giant trionychid species is proposed, and cases of sympatry between members of these size categories are discussed. A detailed discussion of size, identity, and new specimens of the poorly-documented giant species *Rafetus swinhoei* is also offered.

SWIM SPEED OF HATCHERY SEA TURTLES

N. J. Pilcher and S. Enderby [2001, *J. Herpetology* 35(4):633-638] note that many sea turtle conservation projects include hatcheries where eggs are incubated and cared for until hatchlings emerge and are released to the sea. Unfortunately, hatchlings are often retained for prolonged periods in hatchery enclosures after emerging from the sand. During this time they continuously crawl around, burning limited energy reserves, and missing valuable hours of darkness during which they would normally distance themselves from shore. The authors hypothesized that these forms of interference impair hatchling swimming behavior and, in turn, reduce survival rates during offshore migrations. They used hatchlings of *Chelonia mydas* in laboratory experiments to determine effects of retention in hatchery enclosures on hatchling swimming speed and behavior. Results indicate that hatchery operations have a detrimental effect on hatchling behavior. Swimming speed decreased by over 12% with six hours of retention in the hatchery. Swimming style also varied with prolonged retention. Hatchlings frequently used a dogpaddle swimming style (rather than the more efficient powerstroke) after several hours of retention. This deviation in normal swimming style, coupled with decreased swimming speeds, likely hinders hatchling offshore migrations and reduces survival rates.

BIASES IN SAMPLING BLACK RAT SNAKES

K. A. Prior et al. [2001, *Herpetologica* 57(4):460-469] assessed sampling reliability for black rat snakes (*Elaphe obsoleta*) using 1724 captures obtained by two different methods: trapping at communal hibernacula and opportunistic capture of snakes at large. Recapture intervals indicated that opportunistic captures were biased by size (larger snakes were over-represented) but not by sex. Furthermore, opportunistic captures of snakes seen on roads (while observers were driving) had a stronger size bias than other opportunistic captures. Trapping at hibernacula sampled the respective hibernacula populations reliably, but the hibernacula populations themselves were not representative samples of the local population. Among 13 hibernacula, sex ratios ranged from 31 to 65% females and age structure from 42 to 86% sexually mature individuals. Because rat snakes can take many years before they join communal hibernacula, young snakes were underrepresented in all hibernacula samples. We found highly significant differences in the size and sex composition of our samples from the Ontario population and from samples from a population in Maryland (from published data). Those differences seem more likely to be a consequence of biases associated with how snakes were sampled at each location than a reflection of real population differences. The authors recommend that future sampling of rat snakes include opportunistic sampling of snakes at large combined with sampling at several hibernacula. Also, researchers sampling snakes should assess biases in their samples, because biases that are not recognized will be more problematic than those of which researchers are aware.

GEKKOTAN LIZARD TAXONOMY

A. G. Kluge [2001, *Hamadryad* 26(1):1-209] attempts to summarize all published genus and species taxonomic names of extant geckos, including the names of extinct species represented by subfossil material. In addition to the Binomial Taxonomy listing, the paper includes a Taxon Cross-Index, an Author Cross-Index and a Literature Cited section. A serious attempt has been made to cover all of the relevant literature through 1999.

BAJA CALIFORNIA ALLIGATOR LIZARDS

L. L. Grismer and B. D. Hollingsworth [2001, *Herpetologica* 57(4):488-496] report that a revision of the endemic alligator lizard, *Elgaria paucicarinata* from Baja California, México, revealed that it is composed of at least three separate species: *E. cedrosensis* from Isla de Cedros and the narrow coastal margin of adjacent northwestern Baja California; *E. paucicarinata*, which is restricted to the Cape Region of Baja California; and a new species they describe, *E. velazquezii*, which extends along the Peninsular Ranges of central Baja California from at least 41.5 km west of Santa Rosalí a in the north to Misión de Dolores in the south. The new species is unique in that it has strongly keeled dorsal scales, dark dorsal head markings in the shape of spots, bar-shaped transverse black and white markings in the lateral body fold, a hatchling juvenile color pattern of distinct, pale-colored, transverse bands, and lacks a distinct, dark dorsal postorbital stripe.

The Tympanum

Dear Editor:

It's hard to believe that the CHS has shrunk its membership by more than half in a decade during which interest in reptiles has never been higher and the population of the Chicago region has increased by two million people. Gone are the days of free membership lists which permit independent socialization among members. Also gone is Care-in-Captivity—leaving us recommending a website for information on herps. What about the people who don't have Internet?

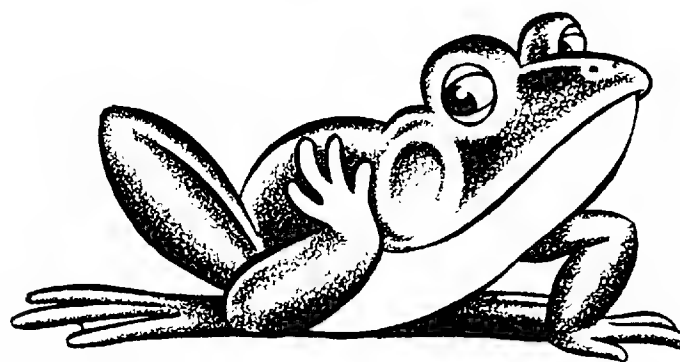
How many people are attending general meetings these days? I read you're moving to a smaller space. In the wild, populations which fail to "recruit" reproductive adults soon decline. This is why every attempt to save a species focuses on breeding. I am not for a moment suggesting intermember reproductive efforts; rather the human method of recruiting—persuading the juveniles/young adults of others to join the band.

Some would suggest a study to figure out why we are "losing members." I'd rather suggest that we consider former members of our population only a possible resource and consider how to get new members. Even in our best growth curve, we lost half of the members "due to renew" in each month. And, even when we sent second notices, we still only got back 75 percent of those "due to renew" in any month. So to stay steady, we had to recruit the same number as we knew we'd lose. I always found that it was much easier to get a new, excited member than to try to talk back someone with their scales all akimbo from some incident. Also new members got "Care-in-Captivity" and the Membership Directory instantly upon membership making them obvious to other people at the meetings as "New Members." Lots of interesting conversations started this way.

Use the membership list as data and count up how many members are due to renew in each month; then plan activities which should increase membership at the times of greatest non-renewal. This will keep the membership cash flow more stable and less "boom/bust" than if all the renewals come in a particular month. About once a year, I'd mail all the non-renewing members and ask them to rejoin. This mailing generated 10 to 25 percent response. Has this been tried recently?

So, how to recruit new outside members now? Is our message still viable? Is there still a need for education about herps? From the newspaper articles I see every month I feel CHS should grow because its message is important and there is still a great need for youth to have things to do other than watch television alone in the dark.

We used to send out notices to colleges and schools with a Don Wheeler cartoon and a note saying "please post." High school letters went to "Biology Teacher" and college mail was addressed to "Department Secretary." The rest of the addresses are in the phone book. We used to get a lot of students at meetings. We used to send the same notices to the zoos, aquarium and museum departments most similar to our mission. I recall that many of these people were active over the years; reading your board list now, I don't see them.



Is out-of-town membership stable or changing? If local non-Chicagoans are dropping, is it possible that gridlock has finally cost CHS its monthly meeting? Perhaps it is time to do a rotating monthly; one to the north, one to the west, one to the south and one in Lincoln Park. One of the reasons I left Chicago was the traffic. It could take

me 30 minutes to get to the museum and I only lived two miles away! Events in the suburbs could take half a day to get to—even 6 A.M. on weekends now seems to be locked up solid.

Things that were very interesting for new members were the board meetings in homes. That way you got to see all the cool herps. However, it was a nuisance for people to have to host a meeting and *Bulletin* stuffing party and it was great to get to professional rooms with long tables instead.

How about house tours and zoo tours? Everyone wants to see "behind-the-scenes." Out here 15 Victorian houses or gardens go on tour in the spring for charity. In a county with only 175,000 population; they sold more than 2,000 tickets. . . .

Are shows making money or not? Has the swap meet finally done in education? I hope not, I always liked ReptileFest and was sorry not to be able to attend in 2001.

How about television? There's local access and feature film outlets on Chicago media. How about local print and television news? How about becoming involved in Chicago-area conservation groups? What have we done to conserve local herps lately?

What other way could CHS reach new people? How can we encourage people to become involved, attend meetings to exchange information or publish what they know and have learned about herps? It's grow or die time, folks. Plot the curve of membership for yourself. How many years do we have to 100 members?

Ellin Beltz, P.O. Box 934, Ferndale CA 95536.

Ellin, your letter asks a lot of good questions. And I can assure you that each of those questions was raised and vigorously discussed at one or more board meetings during the past year. You also made many good suggestions, several of which have already been implemented. For instance, follow-up postcards are sent to all who fail to renew. And we have offered zoo tours in three of the last four years, with another in the works this year. Last year we joined Chicago Wilderness, and we intend to work with them in the future to further our local conservation goals. Your suggestions about publicity touch on a sore point. The board is very much aware of the need for more efforts in this area, and has been for a long time. But so far very little has been done, primarily because no one has come forth who possesses the right combination of time and talent to get the job done. Perhaps this letter of yours will draw the perfect volunteer out of the woodwork. I sure hope so. On an optimistic note, the mailing list for the January 2002 Bulletin comprised 813 members, five more than the 808 who were signed up in January 2001—not definitive evidence that our membership is again rising, but surely a good sign. MAD

Advertisements

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail: GrmtRodent@aol.com.

For sale: murine-pathogen-free rats and mice available in all sizes, live or frozen: pinkies, fuzzies, crawlers, small, medium and large. Frozen crawler mice in lots of 2000, \$.17 each. Also available, full grown hairless mice. FOB shipping point. Master Card accepted. Call (518) 537-2000 between 8:00 A.M. and 5:00 P.M. or write SAS Corporation, 273 Hover Avenue, Germantown NY 12526 for prices and additional information.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. We feed our colony a nutritionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. Mice starting from: pinks, \$.17 each; fuzzies, \$.24 each; hoppers, \$.30 each; weanling, \$.42; adult, \$.48. Rats: starting with pinks at \$.45 each, to XL at \$1.80 each. Discount prices available. We accept Visa, MC, Discover or money orders. P.O. Box 85, Alpine TX 79831. Call us **toll-free** at (800) 720-0076 or visit our website: <http://www.themousefactory.com>.

For sale: from Bayou Rodents, excellent quality feeder mice and rats. Every size available. Pinks starting at \$20/100. Orders are shipped by overnight service Monday thru Thursday. We accept Visa, MasterCard and Discover. For more info, contact Rhonda or Peggy, (800) 722-6102.

For sale: **high quality frozen feeders**. Over a decade of production and supply. Seven sizes of mice available: small newborn pinks up to jumbo adults. Prices start at \$25 per 100. Feeders are separate in the resealable bag, not frozen together. Low shipping rates. Free price list. Kelly Haller, 4236 SE 25th Street, Topeka KS 66605, (913) 234-3358 evenings and weekends.

For sale: books. *Madagascar—A Natural History* by Ken Preston-Mafham, 1991, 224 pp., many excellent color photos, DJ, hardbound, 33 pp. on reptiles, \$45; *Das Neue Schlangenbuch in Farbe* by Fred Kundert, 1984, 235 pp., 196 exceptional color photos including some rare species, very little text (in German), DJ, hardbound, \$65; *The Reptiles of Maryland and the District of Columbia* by Robert H. McCauley, Jr., 1945, 194 pp., 48 b&w photos, softbound, \$35; *Riesenschlangen aus Aller Welt* by Zdenek Vogel, 1973, 102 pp., 60 b&w and 2 color photos, text in German, softbound, \$26; *Encyclopedia of Australian Animals—Reptiles* by Harald Ehmann, 1992, 495 pp., numerous color photos, range maps, DJ somewhat wrinkled, hardbound, comprehensive reference, \$120; *Records of the American-Australian Scientific Expedition to Arnhem Land, Vol. 4 - Zoology* edited by R. L. Specht, 1964, 533 pp., many b&w and a few color plates, DJ torn at top and bottom, hardbound, includes mollusks, fish, amphibians, reptiles (35 pp.), birds, and mammals collected on a joint 1948 scientific expedition of the National Geographic Society, Smithsonian, and Commonwealth Government of Australia, \$375. All books in excellent condition except as noted. Prices postpaid. William R. Turner, 6838 S. Ivy Street, #302, Englewood CO 80112, (720) 493-9378. E-mail: turnerbmrk@prodigy.net.

For sale: Green anacondas, c.b. 9/01, beautiful, healthy and DOCILE, \$175 each; yellow anacondas, c.b. 6/01, flawless little screamers, \$95 each; Amazon tree boas, c.b. 7/01, solid yellow, \$125, orange and green, \$150, both are female; 11' female tiger retic, stunning specimen, tame and a great feeder, \$550 or best offer; jungle carpet pythons from nice black and yellow parents, \$100 each or \$175/pair. Mark Petros, Strictly Serpents, (847) 836-9426, E-mail: MLPserpent@hotmail.com.

For sale: Send SASE to CRC, P.O. Box 0731, Las Vegas NV 89125-0731 for brochures and list of species available. Limited bookings available for guided tours of herpetological collection sites in Nevada. Call/fax (702) 450-0065. URL <http://www.herp.com/crc/> E-mail: crcsafetie@aol.com.

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Wanted: c.b. rough-scaled sand boas; c.b. orange & albino Kenyan sand boas; c.b. Savu pythons. Mike Wood, 1025 Shady Lane, Warsaw IN 46580, (219) 269-7664.

Wanted: big-headed turtles; mata mata turtles; Mexican giant mud turtles (*Staurotypus triporcatus*); exceptionally large common snappers (45 lbs. & up); large alligator snappers (over 90 lbs.); spectacled caiman from Trinidad, Tobago and Surinam; dwarf caiman; smooth-fronted caiman; albino turtles (except red-eared sliders). Walt Loose, (610) 926-6028, 9:00 A.M. – 1:00 P.M. or after 11:30 P.M. Eastern Time.

Line ads in this publication are run free for CHS members — \$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: MADadder0@aol.com.

CHS MEMBERS



HAVE YOU SIGNED UP YET?

ReptileFest 2002 is fast approaching...

"I only have one animal and it's not very interesting"

To most members of the public, ANY reptile or amphibian is interesting. Besides - if you only have one animal to display, you'll be able to focus on its care and natural history!

"I'm too busy"

Too busy to help the CHS with its biggest event of the year? If you can't be there the entire time, then just help for a couple hours Friday night, Saturday, or Sunday - that's plenty! Our goal is to get more people to participate - it makes it easier for everyone.

"I'm new to the society and don't know much about herps"

The public is just as interested in hearing about personal experiences with herps as more scientific info. Also, ReptileFest is a great place to learn from other CHS members!

"It sounds like more work than fun"

It certainly takes a lot of work to sponsor a big event like this. But it takes a lot of work to organize a big party, too! Ask anyone who has participated in years past - they'll tell you its one of the best things they've done with the CHS.

Fill out an on-line exhibitor application **today** or contact **Darin Croft** at (773) 288-8851 / dcroft@fieldmuseum.org
The ReptileFest **web page** is at www.chicagoherp.org

News and Announcements

HERP OF THE MONTH

To promote attendance at the CHS monthly meetings, the Board of Directors has agreed, on a trial basis, to offer a new monthly feature known as "Herp of the Month." Each monthly meeting will showcase a different herp and CHS members can bring one specimen of the "Herp of the Month" to be judged against other entries from other CHS members. Ribbons and/or trophies will be awarded to the top three winners.

For the February 27 meeting, members are asked to bring toads—any *Bufo* species will qualify. And for the March 27 meeting salamanders will be featured.

SHEDD AQUARIUM 2002 ANDROS IGUANA RESEARCH EXPEDITION

Join scientists from the John G. Shedd Aquarium in performing crucial research to help save the threatened Bahamian Andros iguana (*Cyclura cychlura cychlura*). Shedd Aquarium has been exploring Andros Island for the past three years in search of the elusive iguana. Virtually nothing is known about this animal except that it faces severe threats for its continued survival. Despite illegal hunting, feral animals, and habitat loss, the Shedd Aquarium has discovered isolated populations suitable for life history studies. Participants will assist with iguana captures, measurement records, habitat assessments, and radio telemetry. We also will be visiting the local people to discuss the plight of the iguana and raise awareness for the need to protect the endemic reptile.

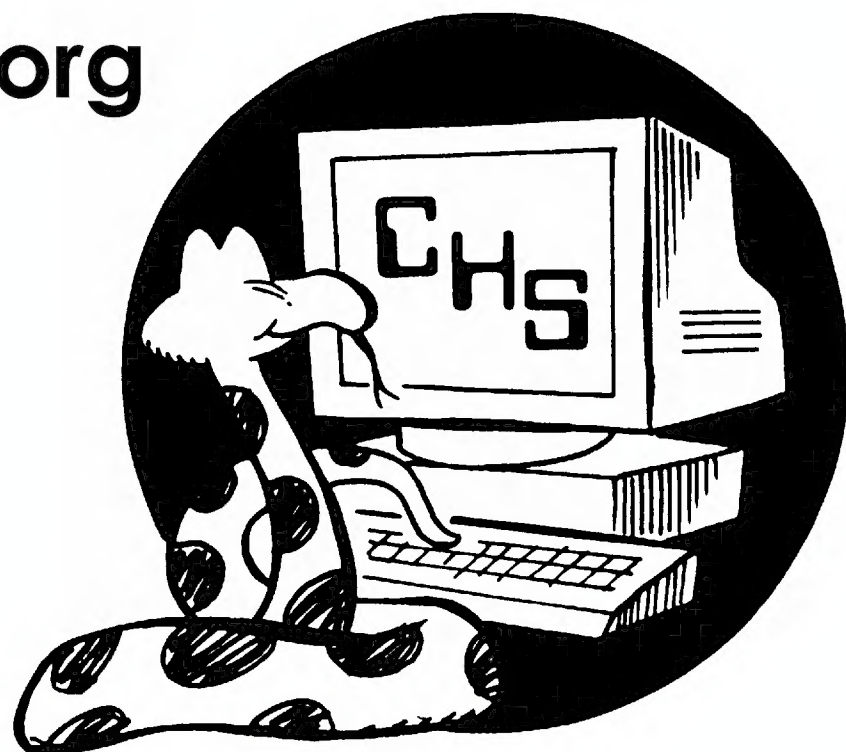
Andros Island is rugged and thought by some to be the largest tract of unexplored land in the Western Hemisphere. Therefore, this trip is for people with a sense of adventure and who want to get involved in a conservation program that produces tangible results. We will be staying aboard the *Coral Reef II*. The trip is from March 30 to April 7, 2002. Trip price is \$2,000, which includes accommodations, food, transfers from Miami International Airport, and the Bahamas exit tax. For more information, contact Chuck Knapp, cknapp@ufl.edu or Sonja Tiegs, stiegs@sheddaquarium.org.

Next time you surf the WorldWide Web, crawl, run, slither, slide, jump, or hop over to the CHS web site!

www.chicagoherp.org

You'll find:

- Announcements
- CHS animal adoption service
- CHS events calendar & information
- Herp news
- Herp links
- Meeting/guest speaker information
- Photos of Illinois amphibians & reptiles
- Much, much more!



Chicagoherp.org is accepting applications for banner advertisements or links from herpetoculturists and manufacturers of herp-related products. Visit the site and contact the webmaster for details on how you can sponsor CHS!

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, February 27, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. Our featured speaker will be **Richard B. King**, of the Department of Biological Sciences, Northern Illinois University. Richard will speak on "Movements and Hibernation of the Lake Erie Watersnake: Implications for the Recovery of a Threatened Species."

At the March 27 meeting our own **Don Wheeler**, creator of "The Adventures of Spot," will speak on "Tales from the Golden Age of Rattlesnake Hunting." Don will have copies available of his new book of the same title, and will be happy to autograph them.

The regular monthly meetings of the Chicago Herpetological Society now take place at Chicago's newest museum—the **Peggy Notebaert Nature Museum**. This beautiful new building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the March 15 board meeting, to be held at the North Park Village Administration Building, 5801 North Pulaski Road, Chicago. To get there take the Edens Expressway, I-94, and exit at Peterson eastbound. Go a mile east to Pulaski, turn right and go south to the first traffic light. Turn left at the light into the North Park Village complex. At the entrance is a stop sign and a guardhouse. When you come to a second stop sign, the administration building is the large building ahead and to your left. There is a free parking lot behind the building.

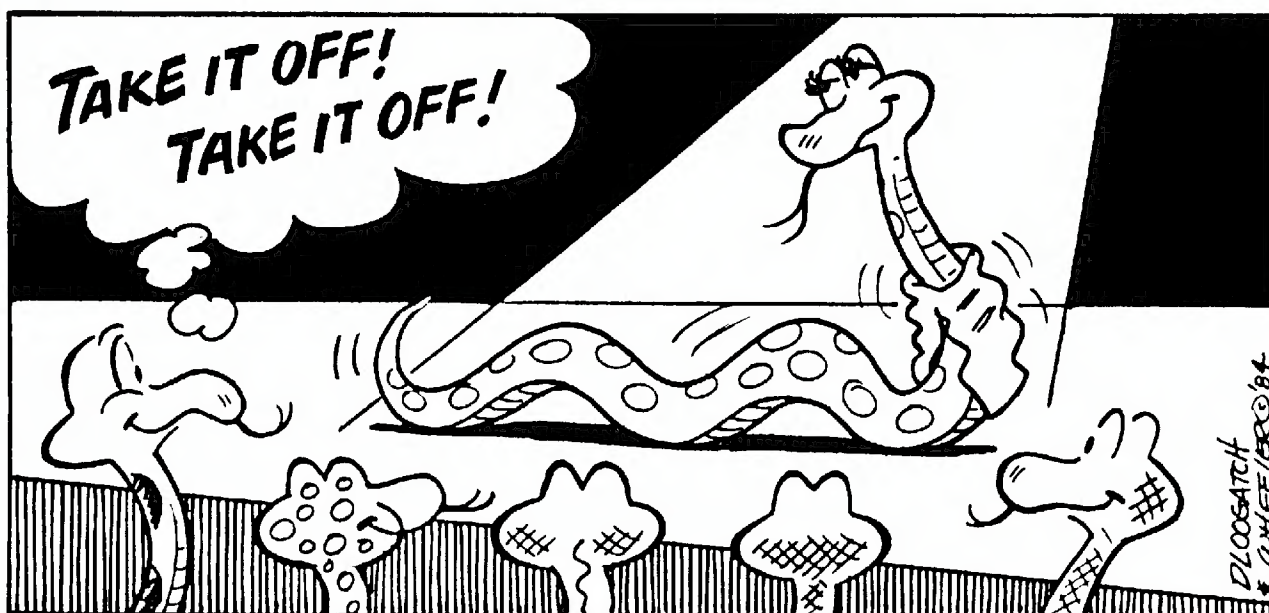
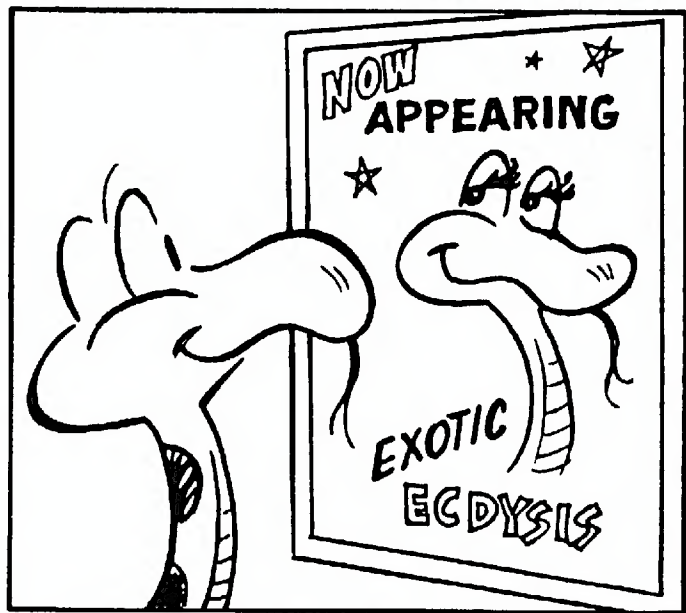
The Chicago Turtle Club

The next meeting of the Chicago Turtle Club will be on Sunday, March 10, 1:00 – 3:30 P.M., at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Meetings are informal; questions, children and animals are welcome; parking is free. For more info call Lisa Koester, (773) 508-0034, or visit the CTC web site: <http://www.geocities.com/~chicagoturtle>.

2002 SALAMANDER SAFARI

This year, the annual CHS Salamander Safari will be held on Saturday, March 23, 9 A.M. – 3 P.M., beginning at the newly renovated Plum Creek Nature Center at Goodenow Grove Forest Preserve in Will County. The telephone number of the nature center is (708) 946-2216. Goodenow Grove is south of Crete, Illinois, 1¼ miles east of the intersection of Route 1 and Route 394 on Goodenow Road. If you need directions to get to this area, call the nature center or call Ron Humbert at (630) 620-7377. From the nature center we will drive to a new Forest Preserve District of Will County land acquisition approximately 2–3 miles north of the nature center, and search for amphibians known to occur at this site. Species found or heard calling in previous inventories include blue-spotted salamanders, gray treefrogs, spring peepers, chorus frogs, bullfrogs, green frogs, and northern leopard frogs. Species not yet found but possibly occurring (or occurring at preserves nearby) include spotted salamanders, newts and wood frogs. As in past safaris, CHS members may bring interesting animals from your personal collections for photography and display purposes. Coffee, juice and donuts will be provided, and a good time will be had by all!

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